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ABSTRACT

Sectoral transformation (inter-industry shifts), which is generally analyzed by use of the Fisher-Clark tri-partite division, is examined in this study dealing mainly with the 1960-1970 decade and based on the 1/100 sample of the 1960 and 1970 censuses. (The Fisher-Clark tri-partite division of labor involves a primary sector--agriculture, mining, fishing, forestry; secondary sector--manufacturing, construction, and utilities; and tertiary sector--transportation, commerce, and services.) A new six-sector industry classification scheme is presented to increase the meaningfulness of the tertiary sector, which previously has been a residual category. The six sectors are extractive, transformative, distributive services, producer services, social services, and personal services. Attention is centered on these issues: (1) Identifying the industry structure and tracing its transformation, (2) who is employed in what sectors and industries, and (3) important consequences of sectoral transformation. The first issue is addressed in the chapters on long-term trends (1870-1970) of the sectoral transformation (II), work scheduling and stability of employment (III), age structure and industry change (IV) and the interrelation of industry and occupation (V). The second issue takes up the industry position of females (VI), and the position of Blacks and Mexican Americans in comparison with Anglos in industry and occupational structure (VII). The third issue is covered in the discussion of earnings inequality and the relative merits of the sector model and the human capital model (VIII). The final chapter (IX) addresses a number of sociological implications of the movement to the service economy. Some policy implications of this research are included. (NTIS/TA)

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THE EMERGENCE OF A SERVICE SOCIETY: DEMOGRAPHIC AND SOCIOLOGICAL ASPECTS OF THE SECTORAL TRANSFORMATION OF THE LABOR FORCE IN THE U.S.A.

Harley L. Browning
The University of Texas at Austin

and

Joachim Singelmann
Vanderbilt University

With the Assistance of

Diana DeAre

Nancy Folbre

Allan King

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
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This study examines the sectoral transformation by industry designation mainly for the 1960-1970 period, utilizing the 1/100 Public Use Samples. A new six-sector industry classification scheme is used that provides a greater differentiation of the tertiary sector: 1) Extractive, 2) Transformative, 3) Distributive services, 4) Producer services, 5) Social services, and 6) Personal services. Attention is centered on three distinct but interrelated questions: 1) How can the industry structure be identified and its transformation traced? 2) Who is employed in what sectors and industries? and 3) What are some of the important consequences of the sectoral transformation? The first question is addressed in the chapters on the long-term trends (1870-1970) of the sectoral transformation (II), work scheduling and stability of employment (III), age structure and industry change (IV), and the interrelation of industry and occupation (V). The second question takes up the industry position of females, particularly sex-typing of work (VI), ---CONTINUED--- (Next page)

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and the position of the two largest minorities, Blacks and Mexican Americans, in the industry and occupational structures and how they compare with Anglos (VII). The third question is covered in the discussion of earnings inequality and the relative merits of the sector model and the human capital model in explaining 1959-1969 changes (VIII). The final chapter (IX) addresses a number of sociological implications of the movement to the service economy: conditions of work, work satisfaction, and work alienation and its impact on the class structure. Some of the policy implications of this research are set forth.

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HLB
JS

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SUMMARY OF REPORT

Chapter I: INTRODUCTION

Two great trends characterize the sectoral transformation (inter-industry shifts) of the U.S. labor force during the last century: the movement out of agriculture and the growth of services. While this report covers all inter-industry shifts, particular attention is given to the expansion of services, both because of the relative recency of this change and because the causes and consequences of the move have been relatively neglected and therefore are not well understood.

Generally, the sectoral transformation has been analyzed by using the famous Fisher-Clark tri-partite division: primary (agriculture, mining, fishing, and forestry); secondary (manufacturing, construction and utilities); and tertiary (transportation, communication, commerce and services). Clark saw economic development as involving the movement out of the primary sector into the secondary sector and then from the secondary to the tertiary sector. Essentially, the forces behind these shifts were productivity gains (movement from lower to higher productivity industries) and the rising per capita income that stimulated the demand for a variety of services.

Although the three-sector scheme continues to be used, its value has progressively become weakened because the tertiary sector, which includes services, has increased much in relative importance but has become at the same time, because of the heterogeneity of services, more and more a residual category. It is difficult to speak meaningfully of the tertiary, when it includes banking and barbering, domestic and medical service, accounting and postal services. To attack this problem, a new sectoral allocation scheme is presented in this report, one that breaks down the tertiary into more meaningful sectors. The six-sector scheme is as follows:

1. Extractive (identical with primary sector)

2. Transformative (identical with secondary sector)

3. Distributive Services (transportation, communication, wholesale and retail trade, excepting eating and drinking)

4. Producer Services (financial, insurance, engineering, law and business services)

5. Social Services (health, education, welfare and government)

6. Personal Services (domestic, lodging, repair and entertainment)

Distributive and Producer services are "goods-oriented" services, because they cater to goods or matters related to property. They are also intermediate between the first two "production" sectors and the last two "consumption" sectors. Social services are new to the extent that their mass consumption historically is relatively recent, and the funds for their operation are dependent to a considerable degree on government revenues. Personal services are more heterogeneous, but they have in common an orientation to the individual consumer and the size of establishment is relatively small.

The Browning-Singelmann classification scheme was developed heuristically, based on a dissatisfaction with the Fisher-Clark scheme. It therefore does not purport to be a theory of development nor even of sectoral transformation. There is a similarity of approach with two other sector allocation schemes (Katouzian and Singer) derived independently, suggesting a move in the same direction. In any event, recognizing that even the six-sector scheme has considerable within-sector variability, most of the tables in the report provide figures on 37 industries within the six sectors. The main source of data is the U.S. Bureau of the Census 1% Public Use Samples for the census years of 1960 and 1970. Taken at the national level, they provide the most flexible means of analysis.

Chapter II: THE HISTORICAL CONTEXT OF THE SECTORAL TRANSFORMATION, 1870-1970

Most of the report is devoted to the 1960-1970 decade, based upon the 1/100 sample of the 1960 and 1970 censuses. This decade should not be seen in isolation, however, but in the historical context of a century of change, even if the coverage cannot do justice to the complexity of earlier periods.

In 1870, 52.3% of the U.S. labor force was in the Extractive sector. Fifty years later in 1920 it had declined to 28.9% and by 1970 it had further declined to a mere 4.5%. The Transformative (secondary) sector for the same periods rose from nearly a quarter (23.5%) of the labor force to nearly a third (32.9), but then changed relatively little over the next fifty years, ending at 33.1% in 1970. Of course, output in agriculture and manufacturing, especially in the last fifty years, have had astounding gains, due to greatly increased productivity. Clearly, the number or proportion of persons employed in a sector does not necessarily reflect the magnitude of its output.

Turning to services, the importance of distinguishing among the sectors and even the industries becomes necessary, for although services as a whole increased for every decade, the gains were very uneven, and in one important industry exception, there was a large decline. Domestic service was 7.4% of the total labor force in 1870 (nearly a third of all services), but by 1970 it had dropped to 1.7%. Distributive services had its greatest relative gain during the period 1870-1920, with transportation experiencing a strong expansion. Since 1930, however, the system of transport has been able to move goods and people with proportionally fewer workers. Trade, on the other hand, has increased slowly but steadily through the century, doubling its' share of the labor force. Producer services were so small they were included with trade until 1910, but in the last half century they have had an impressive surge, going from 2.8% to 8.2% of the total labor force. While some industries in Personal services grew, the impact of the decline in domestic service has meant almost no change for the century (9.3% in 1870 to 10.0% in 1970).

The really impressive change among services occurred in Social services, for the sector increased in every decade from just 3.4% in 1870 to 21.9% in 1970, the gain being greatest during the last two decades. Within the sector, education jumped from 3.8% to 8.6% between 1950 and 1970, whereas government--often maligned for "bloated" growth--increased from 3.7% to 4.6%.

All the above-noted changes occurred in a country that witnessed many other basic structural transformations. The percent urban increased from about one-quarter to three-quarters of the population, the white-collar component of the occupational distribution grew from 18% in 1900 to 49% in 1970, and the female participation rate more than doubled during the latter period, from 20.4 to 43.4. These changes were closely related to the sectoral transformation. Although this sectoral transformation has had its greatest shift since 1940, the trend had begun much earlier in American history.

Chapter III: LABOR INPUT AND WORK CONTINUITY

The trend to the service sectors has been very pronounced in terms of employment but it is not necessarily true that there have been comparable changes in terms of labor input. That is, the distribution of workers among industries will not necessarily coincide with the distribution of labor as measured by the yearly hours worked. Attention has been called to the fact that services are characterized by a high proportion of part-time employment, so it may be that the shift to the services is a good deal less impressive if one uses input rather than employment as the standard.

Taking the 40-hour week as the standard for employment, Transformative and Social Services have the highest figures (each approximately one-half) with male and female showing little difference. Extractive and Personal services have the lowest proportions (about one-quarter), with Distributive and Producer services intermediate. With weeks worked, the sex difference widens considerably, with three-quarters of males working 50-52 weeks in 1969 compared to 50% for females. It is possible to combine hours per week and weeks per year into an overall index of yearly hours per worker. For the total male labor force it was 2002 hours, while the female labor force was three-fourths this total, at 1521 hours, and were lower in all six sectors.

In comparing the distributions by employment and hours, it is true that service sectors as a whole have less hourly than employment representation, but this difference is in large part due to the female distribution. Three industries account for the female pattern: retail, education, and domestic service; together they account for -4.5% in hours as compared to employment.

It is known that service sectors in total have expanded but it is not known how this shift has occurred. Was the expansion brought about mostly by people moving from Extractive and Transformative sectors into services, or did services grow largely because of new labor force entries? This question can only be answered wholly satisfactorily by detailed work histories, but this is not possible with census data. However, the 1970 census had a question that asked the industry a person was employed in 1965. Since the question was asked of all persons, it includes people who were not in the labor force in 1970, but did work in 1965, as well as those who were not in the labor force in 1965 but who were employed in 1970.

Generally, the data do not indicate that the sectoral transformation of the labor force has been the result of persons having left other industry sectors for employment in Social and Producer services. It can be concluded, therefore, that the growth is mainly due to persons not previously in the labor force who enter these particular services in disproportionately large numbers.

Chapter IV: AGE AND SECTORAL TRANSFORMATION

Age is a variable worthy of consideration in its own right, rather than simply as a control variable, as is so often done. In terms of the age distribution, the Distributive, Personal and Producer services are more likely to be entry sectors, while the Extractive sector has its strongest representation in the older age categories. The age-sex pyramids for sectors and industries reveal the considerable variation that exists. Only a few pyramids display similar configurations for the male and female sides; the sexual division of labor is strikingly apparent at a glance.

While a comparison of age-sex distributions for the 1960-1970 period is valuable, what is needed is a standard by which to evaluate the change during the decade. The familiar practice of formulating an expected change and then comparing it with the actual change is our point of departure (in this instance the "shift" technique is used). For five age categories the growth rate for the decade of the total employed population is taken as the standard or expected change. It can then be compared to the change for specific sectors and industries. The difference between the two sets of figures indicates the extent to which age categories for each sector and industry grew more or less rapidly than expected. The shift analysis separates the actual change into two components: the expected change and the net shift. The expected change (the growth rate of all persons in the age category) reflects such factors as changes in age and sex specific participation rates, changes in age of entry and of retirement, etc. The assumption is that all such factors affect the groups equally within each sector and each industry. The net shift component is assumed to pick up changes caused by intersectoral movements of members continuing in the labor force, as well as the differential patterns of the incorporation of entry cohorts into specific industries and sectors.

It is difficult to summarize the diversity of findings that the variable of age assumes, but it is very clear that there is nothing mechanical or indeed obvious about the ways through which age operates in the transformative process. One of the features of the net shift results is the pattern of sign consistency. With only a few exceptions, the signs for the five age groups within sectors and industries go in the same direction; they are either positive or negative. This pattern could have been anticipated for industries that grew much less than expected (e.g., agriculture) or much more (e.g., education) but its presence in other industries is rather a surprise. An additional generalizable feature is the relatively narrow range that the net shift displays as a percentage of the 1960 size. If one age group is growing much more rapidly than expected then the others will also, and vice versa. The proportion of the total positive and net shift accounted for by Social services is remarkable: 76.8% for total, 58.5% for male and 81.9% for female. The last figure is especially impressive, for the net shift technique controls for the increase in labor force participation of women during the 1960-1970 decade.

Chapter V: THE INTERRELATIONSHIP OF INDUSTRY AND OCCUPATION

Industry and occupation are interrelated. Specific enterprises are created within specific industries and then individuals are recruited to occupy specific occupational positions. A theory of work allocation has not been formulated that encompasses simultaneously these two dimensions; both economists and sociologists concentrate on occupational position.

In linking changes in occupational structure to changes in industry structure, particularly the sectoral transformation of the labor force, it is established that during the 1960-1970 decade four occupational categories expanded their shares of total employment: professionals, semi-professional, clerical workers, and service workers. Most impressive was the growth of professionals and clerical workers. The growth of these occupations during the 1960's resulted in two changes: 1) clerical workers replaced operatives as the largest single occupational category; and 2) white-collar workers now outnumber blue-collar workers. Such changes in the occupational structure merit analysis in their own right. For example, the growth of professionals can be seen as the diffusion of expertise and the growth of clerical workers as an indicator of the bureaucratization of the work force.

In this chapter, however, the focus is on the attempt to identify the sources of occupational changes by demonstrating how industries differ in their occupational distribution of employment. Farmers are found only in agriculture, but most other occupational categories are spread throughout the various industries. As the industry structure of the labor force changes one should also expect changes in the occupational structure. It is thus possible to identify two sources of changes in the occupational structure: 1) changes in the occupational distribution of employment within industries irrespective of changes in the industry structure; and 2) changes in the industry itself, as in the sectoral transformation of the labor force.

The findings show that two-thirds of the changes in the occupational structure between 1960 and 1970 resulted from the component of sectoral transformation. In particular, the case of professionals is interesting. Had total employment not shifted from industries with a low professional demand to industries with a high demand for professionals, there would have been proportionately fewer professionals in the labor force in 1970 than in 1960. In other words, the within-industry specific demand for professionals decreased during that period. Of course, this situation did not exist in all industries, but was found primarily in those Social services, such as medical services, that traditionally have employed a large proportion of professionals. This trend suggests that such industries have become more bureaucratized and their work more standardized. To continue with the example of medical services, more and more work is delegated from professional to service positions. In this instance the increase in service workers largely was due to changes in the occupational distribution within industries.

The identification of the sectoral transformation as a source for occupational changes has some important consequences for social mobility. As a result of the shift from goods-producing industries to services the proportion of higher-status occupations increased, thereby creating a favorable environment for upward mobility. As the pace of the sectoral transformation slows, this source of demand for higher-status occupations will decline. Unless this trend is offset by factors that foster the "upgrading" of the occupational distribution within industries, the result will be a greater competition for higher status positions and lower upward social mobility.

Chapter VI: FEMALES IN THE LABOR FORCE

One of the more striking features of the sectoral transformation is the growing importance of females in the service sectors. In 1970 over 78 percent of all women were employed in services, as compared to 47 percent of all males. But not all services are equally female-oriented. Women are most concentrated in Personal services (save for repair services) and Social services, whereas they account for a relatively small share of employment in transportation and wholesale trade. Related to the concentration of women in service industries is their occupational distribution: in 1970 two-thirds of all employed women had professional, clerical, or service occupations. By contrast, males were relatively more concentrated in the blue-collar occupations of operatives and craftsmen, together accounting for two-fifths of total male employment in 1970.

In both 1960 and 1970 females were more likely to have a professional occupation than were males. This finding must be taken with caution, however, since women professionals in general occupy predominantly the lower-status positions of primary and secondary teachers and nurses. Nearly nine of every ten female professionals in 1970 were employed in education, medical services and hospitals.

While the sex-typing of occupations is well known, the sex-typing of industries is also apparent. Industry sex-typing occurs when one industry is dominated by either sex, independent of its occupational distribution. To analyze the amount of industry sex-typing it is assumed that the percent female in each occupational category is constant among industries. Thus, if a certain industry has a high demand for craftsmen, it can be expected that females are less represented in this industry than in the total labor force, for there are very few craftswomen. By comparing the number of females in a given industry that could be expected on the basis of the industry-specific occupational distribution with the actual number of females in that industry, the degree of industry sex-typing can be determined. If an absolute difference of 10 percentage points between the actual and the expected number is set as the criterion for sex-typing, the following industries were found to be female dominated in 1970 (in decreasing order): domestic service, textiles, laundry, hospitals, medical services and education. The following industries were male dominated in 1970: postal services, engineering, transportation, mining, utilities, wholesale trade, real estate, chemical, accounting and government. It should be noted that the listing of industries that were sex-typed in 1970 is very similar to those that were sex-typed in 1960.

In the past, the physical requirements of work has often been cited as contributing to the division of labor by sex. In a service-dominated labor force, however, work has lost most of its demands for heavy muscular effort, thus providing at least the opportunity for men and women to work in comparable positions.

Chapter VII: THE SECTOR AND INDUSTRY POSITION OF MINORITIES

In the first part of this chapter blacks and whites on the national level are compared. In the second part the analysis is extended to include Mexican Americans, but due to data limitations (the Bureau of the Census identifies Mexican Americans only for the five Southwestern states), this analysis can be carried out only at the regional level.

During the 1960's the industry structure of black employment changed more than did that of whites. Black males primarily left agriculture and Personal services. One of the most striking changes was the pronounced decreasing share of black female employment to be found in Personal services. In 1960 this one sector accounted for over one-half of all employed black females, but in 1970 the corresponding figure was only 29 percent. As a result of these changes, black and white workers of both sexes were more equally distributed than was true ten years earlier.

Despite the increasing similarity between blacks and whites with regard to industry structure, a substantial gap still remains in terms of occupational status and income. Two-thirds of black males in 1970 were employed as operatives, service workers, laborers, or farm workers, which is twice the share for white males. Black females also showed a higher concentration in these occupations than did white females, but the difference between black and white females was not as large as that between black and white males. In general black females compare more favorably with white females than do black males with white males, be it in terms of educational attainment, occupational status, or income. The data for income were particularly noteworthy, for in 1970 the median income of black females was higher than that of white females in 14 industries. All of these industries except one were services of one kind or another, with most of the ten belonging to the Social services sector. It should be noted, however, that black women on the average also worked more hours per year than did white women, particularly in Social and Personal services, which would increase their earnings relative to white women.

There are additional reasons why black females have a better relative position than black males. For one thing, females in general are in less favored positions than males. Thus, once the sex differential in terms of the labor situation is controlled for, not much additional discrimination exists. Moreover, black females have a higher labor force participation rate than white females. Since continuity of employment is positively associated with income, black females should be expected to do as well as, if not better than, white females.

In the second part of Chapter VII Mexican Americans are included in the analysis. Besides the interest in examining the labor force situation of the second largest minority group in the country (compared with blacks not much information exists about Mexican Americans), the inclusion of Mexican Americans permits the comparison of the work situation of the two minorities with each other. The findings show that although Mexican Americans had a lower educational attainment than blacks, they occupied higher-status positions. This finding casts serious doubt on the assumption traditionally held that the lower occupational status of blacks in comparison to whites is, by and large, a consequence of their lower educational attainment. Although the effects of education on occupational status cannot be ignored, two different levels of analysis must be distinguished. While higher educational attainment benefits individual members of minority groups, a general increase in educational attainment among all blacks might not improve materially their aggregate labor force situation in relation to whites. The data thus suggest that the lower occupational status of blacks, while partly the result of their lower educational attainment, also results from discriminatory employment practices. The reason why this does not apply to Mexican Americans to the same extent is the fact that as a minority group they are less readily identified than blacks (the Bureau of the Census, while recently providing much more information on the Spanish origin population, still classifies Mexican Americans as white). As a group, Mexican Americans are less subject to discrimination than are blacks.

Chapter VIII: EARNINGS DISPERSION AND THE SECTORAL PATTERN OF EMPLOYMENT

In a very fundamental sense, earnings (and since we are dealing with the labor force it is earnings rather than income that concerns us) represent an extremely significant "outcome" of the various factors, as reviewed in prior chapters, that affect the sectoral and industry distribution. Given the macro orientation of this study, however, the concern is not with linking the earnings of individuals with other personal characteristics, but with the distribution or dispersion of earnings by sector and industry. Within this context, the sectoral approach to earnings distribution can be contrasted with the human capital approach. In essence, the former assumes that the distribution of earnings within each sector is regarded as an intrinsic, unchanging characteristic, with the pattern of final demand for goods and services determining the sectoral pattern of employment. In contrast, the latter is a supply-side theory of the earnings distribution, which is a reflection of the skill-mix of the labor force and the rates at which these skills are rewarded. Thus changes in the distribution of earnings are regarded principally as changes in the distribution of labor force skills. An evaluation of these two approaches is made empirically by comparing how well they predict the changes in the dispersion of earnings in the U.S.A. between 1959 and 1969. In addition, the sectoral and human capital approaches can be combined into a single model.

The data apply only to white and black males since the census data are poorly suited for an analysis of the earnings distribution among women in the human capital framework. Principally this is because of difficulties in measuring labor force experience for females because of their often intermittent pattern of labor force participation. The measure used to summarize the earnings distribution is the variance of the natural logarithm of earnings, chosen over other measures principally because it is a relative measure of dispersion. Proportional changes in earnings will have no effect on this statistic.

In predicting changes in the earnings dispersion in the U.S. between 1959 and 1969, it was found that the simple assumption that the variance in earnings within each sector was constant between 1959 and 1969 and the mean levels of earnings increased proportionally (the sector model) resulted in a rather good prediction. In contrast, the human capital model, which assumes that rewards to education and experience of the labor force remain fixed in relative terms over the decade leads to poor predictions of the change in the earnings distributions of both white and nonwhite males. The combined model was outperformed by the sectoral model by a large margin. Further research is needed on how the parameters of the human capital model are likely to change over time, but it is fair to say that there is no macro theory of human capital and little is known about the determinants of the model's parameters.

Chapter IX: THE SECTORAL TRANSFORMATION AND THE NATURE OF WORK IN A SERVICE SOCIETY

Given the key role of the Extractive sector during the 1870-1970 period, it is unlikely that there will be comparable future shifts in the sectors, simply because no one sector can provide the source of change as did the Extractive Sector, when it dropped from 52% to 4% of the labor force. The social and economic consequences of the sectoral transformation are not easy to identify, partly because so much of the change has occurred within the last decades. But if it is probable that the greatest part of the sectoral transformation of the U.S.A. already is behind it, this does not mean, therefore, that we have experienced all the social and economic consequences of the transformation. Institutional adaptation is likely to develop more slowly than the labor force change. For example, the fact that with a few prominent exceptions, e.g. transportation, services are much less unionized than industries of the Transformative sector does not mean necessarily that this is an unchanging relationship. In future decades it is entirely possible that the difference will narrow considerably.

Sociologically, the sectoral transformation can be examined in terms of its effects on work. In general, the shift out of the Extractive sector and into the service sectors has meant a reduced reliance on physical strength to perform tasks. Compared to the Transformative sector, services do not command the advantages of scale, of continuous, routinized output, and they generally cannot be stored. This means that many services can have a greater flexibility in work scheduling than is the case in other industries. This may or may not result in greater work satisfaction, and the reason why this is so is by no means clear. Certainly, it warrants more attention than has been devoted to the problem. The notion of alienation, whether conceptualized in social psychological terms or along more structural and Marxian lines, is germane. The fact that most services do not produce a tangible product conceivably may create even more alienating conditions, for labor and product become one, as in the case of the salesperson.

The relationship of sectoral transformation to social stratification and to social classes and their dynamics still is obscure. The largest sector in services is Social services and here employment is largely concentrated in the public sector. The implications of this for, say, political action are problematical. Interest groups may be expected to emerge out of the configurations of occupation and industry, jointly considered. Because of the lack of agreement about the consequences of the sectoral transformation, or even as to what are the proper questions to be put to this problem, the authors of this report, as did Victor Fuchs in his earlier influential book, The Service Economy, are driven to conclude that much more research is needed on services and, indeed, on all industry sectors as they become transformed.

Chapter I

INTRODUCTION

It is inevitable that in the course of a country's growth and development the labor force must be transformed. There are many facets of this transformation. Moore (1966) has identified the following: 1) the "creation" of the labor force in the technical sense of the separation of work from other activities (still an important consideration for the activities of women); 2) the "upgrading" of the labor force as a consequence of higher skill demands and increased educational attainment, including intra- and intergenerational mobility; 3) the increasingly complex division of labor that calls forth much greater occupational specialization; and 4) the sectoral relocation of manpower from the standpoint of industry allocation. In this study our point of departure will be the sectoral allocation of the labor force and its transformation, but some attention will be given the other features.

First of all, however, an important distinction must be made. Because occupation and industry as labor force categories continue to be persistently confused in the literature, the difference between them should be made explicit. Most simply put, occupation is the kind of work one performs while industry is the kind of place where one works. To illustrate, one's occupation may be as a secretary, but the place of work may range from a gigantic steel mill to a small office of an insurance agent. The growing specialization in our society has made it impossible to deal directly with specific jobs or specific places of work, even though the U.S. Bureau of the Census identifies thousands of occupations and hundreds of industries. In this study relatively gross industry and occupational categories will be used, but we believe this practice will not seriously affect our findings.

Anyone who attempts to make sense of the sectoral transformation of the labor force in both developed and developing countries must be impressed by the two great master trends of the 20th century. The first and best known is the shift of manpower out of the "primary" sector (chiefly agriculture, but including mining, forestry, hunting and fishing). For many developed countries this movement has been going on virtually uninterrupted during the last 70 years or more. Indeed, it has gone much farther than most would have believed possible. In the United Kingdom and the U.S.A., for example, employment in agriculture has dropped below 5 percent of the total labor force, and the decline still continues. In nearly all developing countries a relative decline of employment in agriculture has been observable in the last 30 years, but only in a few countries has an absolute decline in agricultural employment been observed. The movement out of agriculture is assumed to be an integral part of the development process and generally it is agreed that the remarkable increases in productivity in the agrarian sector, when combined with a relatively low elasticity of demand for agricultural as compared to manufactured products, have permitted the decline in agricultural employment.

The second master trend is the shift into the tertiary or service sector. This has been a more recent phenomenon and has not had the impact, at least until now, of the shift out of the primary sector, but the trend is a strong one and appears to be irreversible and of truly universal dimensions. In a recent study of labor force changes in ten industrialized countries (Sorrentino, 1971), all have experienced increases in service employment since 1950, and in six countries the service sector now accounts for over 50 percent of total employment. In the U.S.A., service industries accounted for 62 percent of the labor force in 1970, and by about 1980 we can expect two of every three persons to be employed in a service industry of one kind or another. In developing countries the trend to the service sector also is unmistakable, although it has not attained the same levels as in the developed countries.

The purpose of this study is to examine the sectoral transformation of the labor force of the U.S.A., with special attention given to the shift to service employment. Although a brief survey of the long-term trends from 1870 to 1970 is provided, the bulk of the analysis is devoted to the 1960-1970 period, drawing extensively upon the 1% Public Use Samples available from the 1960 and 1970 censuses.

Before we set forth the content of this monograph, however, it is necessary to place the matter of sectoral transformation in somewhat broader perspective, especially the growth of the services, and to justify why we believe this process to be an important aspect of socioeconomic change. Unlike the movement out of agriculture, there is no general consensus on the causes and consequences of this phenomenon, nor, for that matter, a clear understanding of how this process occurs. In part, this can be attributed to the relative recency of the growth of services. But this is inadequate to account for the relative neglect of industry structure and process as it is linked to economic growth.

Let us consider the situations in economics and sociology as a way of accounting for this neglect. Economics is probably the one discipline where we should expect to find most attention given to industry sectors and their transformation because of their close relationship to economic development. The record, however, is at best spotty. Among notable economists, perhaps it is Simon Kuznets in recent years who has stressed, within an international context, the importance of industry as an analytical variable. As he states in his Modern Economic Growth (1966:153):

> The industrial structure of national output and productive resources is a key aspect of an economy in the process of growth because it permits us to observe the impact of the advance in technological knowledge, the differential response of demand to increased productive capacity and rise in per capita income, and the shifts in the size and location of groups in society associated with different industries. Industries are distinguished from each other by the raw materials they use, by the productive process in which they engage (and hence by the technological constraint on size of plant), by the skill mix of the labor force, by the capital intensity, etc., imposed by the specific production processes employed, and by the finished product, and hence by the market that is being served. Indeed, an industry is defined by these characteristics of material, process, and product; and a marked change in one, often but not necessarily accompanied by changes in the others, is usually a basis for distinguishing and defining a new industry.

But Kuznets was interested in the broad characteristics of the sectoral transformation and he did not pay particular attention to the service sector. It was

Victor Fuchs, first in a number of articles and then in his monograph The Service Economy (1968) who provides what still remains as the best single discussion of the nature of services in the U.S.A. In his opening paragraph (1968:1) he put it as follows:

> The United States is now pioneering in a new stage of economic development. During the period following World War II this country became the world's first "service economy" -- that is, the first nation in which more than half of the employed population is not involved in the production of food, clothing, houses, automobiles, or other tangible goods.

In spite of the fact that services steadily has been becoming more important in the U.S.A., this sector still has not received from American economists much attention, especially in comparison to that lavished on agricultural and manufacturing changes. Fuchs (1968:16) explains this neglect as due to a number of factors:

> ...The greater attention that has been given by economists to the primary and secondary industries might be explained by many factors: (1) Tertiary employment becomes of major importance only when high levels of income per capita are reached. (2) Some early economists, notably Adam Smith, believed that only the primary and secondary sectors were "productive," and that the other industries were in some sense "parasitic." (3) It is usually much more difficult to obtain data for the service industries, many of which are characterized by small-scale operations. This is also true of agriculture but, in that case, at least the output tends to be standardized and thus more easily measured. (4) Much tertiary production is nonprofit; economic analysis has concentrated on market activities.

If the above reasons suggest why the services have not received their due from the economists, the general neglect by sociologists of the dimension of industry position and of services must be sought on other grounds. In brief, the reasons appear to be that sociologists have been mesmerized by occupation, as witness the huge literature on social stratification and social mobility. The few studies of industry position (e.g., Duncan, 1959) have attracted little attention. It is true that Daniel Bell, in his The Coming of the Post-Industrial Society (1973), makes the movement into services one of his key indicators ("A post-industrial society is based on services."), but he largely ignores it as an analytical variable in his subsequent discussion.

We conclude that in both economics and sociology the relative lack of interest in industry sectoral transformation, while due to a variety of factors, has in common the absence of a clearly and compellingly formulated statement of the theoretical importance of this process. In the currently fashionable terminology of Kuhn, there is no "paradigm" for the sectoral transformation that serves to attract attention and to encourage and legitimize research on the subject.

But what is there that is significant about the sectoral transformation and especially the movement into services that merits our attention? Can it be said that we now are in or on the verge of being in a Service Revolution that compares in importance to the Agricultural Revolution and the Industrial Revolution? Probably not. The latter two transformations brought about extensive and innovative changes in settlement patterns, in the spatial links between home and work, in the productivity of labor, in the emergence of identifiable social classes, and in the configuration of power relations related to access to technology and the accumulation of capital. As yet, we are unable to point to any distinctive way in which services have brought about changes in the dimensions mentioned above. Services, like manufacturing, are concentrated mainly but not exclusively in urban areas; most service employment involves the separation of home and workplace; services have not introduced any quantum leaps forward in the productivity of labor; services have not brought into being clearly identifiable social classes that are different from those of earlier societies (e.g., lords and peasants in the Agricultural Revolution and capitalists and proletariat in the Industrial Revolution); and services are not clearly identified with any new or old bases of technology or power.

But the emergence of services as the dominant form of employment does alter society in some important yet not well understood ways. Many of the current trends are contradictory, which makes it even more difficult to identify and to interpret concrete changes. For one thing, the majority of services are becoming increasingly capitalistic, i.e., capital spreads to more and more service industries and the work in services becomes increasingly that of wage labor. However, Social services are among the most rapidly growing of all service industries, and most of it belongs to the public sector. There is a theoretical difference between wage labor in a privately owned, profit-oriented industry and that in a government industry which is nonprofit.

A second major change takes place in the relationship between the worker and his or her labor. As we noted above, most services do not produce a tangible good. Associated with this situation is the continuous decrease of blue-collar work requiring much physical exertion. As we shall elaborate later on, the scheduling of work in many services is quite different from that in most manufacturing. Theoretically, at least, the nature of work in services can be tailored much more to the preferences and needs of the employees and workers than would be possible in goods-producing industries. It must be pointed out, however, that a substantial part of work in services is repetitive and of low status, and is far from being the creative work that some have envisioned as a characteristic of employment in a service-dominated future.

There are other, less concrete, changes associated with the growth of service employment. The close linkage between the production of a service and its consumption and the related contact between the producer and the consumer provides for a different work situation as compared to more isolated production settings. Many employees have to relate to their employers and to their customers. Indeed, many services (whether buying a dress, consulting a physician, or filling out a government form) require close cooperation between those who provide the service and those who consume it. This three-way relationship (employer-employee-customer) has the potential for various conflicts of interest.

Other problems arise when we examine the transformative process and the growth of services at the national level, particularly the relationship of the "tertiarization" process to economic development. Here we find that tertiarization is appraised rather differently in developing countries and developed countries. Generally, in the latter the trend toward concentration of employment in tertiary activities has been viewed positively, as a concomitant of economic growth. Fuchs (1968) makes it quite clear that "The dramatic shift to services has occurred in employment--not in output." In other words, this is no zero-sum game, in which an increase in service or tertiary employment necessarily would bring about a reduction in output in the primary and secondary sectors. The technological advances in these sectors means that production increases more rapidly than employment. Rising per capita income creates a demand for a host of services and the economy can absorb an increasing share of the labor force in service employment. It should be noted, however, that with nearly two-thirds of the labor now in service employment, there now is some apprehension that productivity increases are more difficult to bring about, because of the concentration in this sector.

In contrast, the growth of the tertiary sector in developing countries has been evaluated negatively; indeed, "tertiarization" as it is sometimes called, is considered a sign of mal-development. It is argued that the relative growth of services is unhealthy because it reflects the lack of economic development, as population pressures induce people to leave the unproductive primary sector. They migrate to the cities but cannot be absorbed into the secondary or manufacturing sector. Consequently, they must become street peddlers, domestic servants or other jobs of low productivity characteristic of the tertiary sector. While the theoretical and empirical adequacy of this conception of tertiarization can be questioned (Browning, 1972), undoubtedly there are significant differences between developed and developing countries in the nature of the movement into the Service sector. We introduce this diversion from the discussion of the U.S.A. to show that there is no invariant "evolutionary" sequence for the development of services. Even though they are increasing as a proportion of the labor force in virtually all countries, there are important difference in how they develop.

What has been said in the last several pages should have made sufficiently clear the fact that our understanding of the nature of the transformative process and the emergence of services as the predominant form of employment is imperfect at best. We have only a general idea of the sources or causes of this transformation. Unfortunately, relatively few persons have elected to follow up the leads that Kuznets opened in his general comparative studies, and we lack detailed and rigorous analyses of the various facets of the process.

Even more, we are unclear as to what are the important consequences of the transformative process. Because of the recency of the emergence of the service economy and service society, it is not always easy to recognize and properly interpret the various consequences. One might expect a good deal of help from the futurist literature, but as a whole it has not been very illuminating, except in the most general way. We suspect there are important consequences that we still have not "seen" as yet, and when they are recognized the importance of services will be more fully appreciated.

In addition to the uncertainties about the causes and consequences, we still don't comprehend well the mechanics of the transformative process itself, how this happens and the forms it takes. The greater part of this report is taken up with this problem. Little attention is given to the causes of the transformation or to its consequences, although in the final chapter we shall briefly review some of the effects of the process.

THE PROBLEM OF SECTORAL ALLOCATION OF INDUSTRIES

Before we proceed further, it is necessary to confront a perennial problem that bedevils all efforts to deal with sectoral transformation: the allocation of specific industries to specific sectors. Any classification scheme, to be sure, should not be considered as an end in and of itself, but rather as a means toward some goal. In this case, however, the sectoral allocation scheme is very important because of its effect upon subsequent analyses. This is particularly so because there exists no consensus, derivable from a theoretical base, on how industries should be allocated. Fuchs (1968:15) notes that "The two criteria most frequently mentioned are closeness to the consumer and the presence or absence of a tangible product," but he immediately comments on the difficulties of applying these criteria. Services ought to be closest to the consumer, yet many activities generally classified as services (e.g., advertising, wholesale trade, bulk transportation, and some government services) do not deal directly with the consumer. And not all forms of services (shoe repair or a dental brace) are intangible.

In order to conduct the analyses reported in subsequent chapters of this monograph, some sort of parsimonious industry classification scheme is required. Preferably, this scheme should be formulated so as to be consistent with interpretations of sectoral transformation and economic development. The most familiar of existing schemes is the Fisher-Clark three-sector model. While the idea of a tripartite division of industries can be traced back as far as the Swiss census of 1888 (Menz, 1965), it was the scheme advanced by A.G.B. Fisher (1935) and Colin Clark (1940) that became widely disseminated. The Fisher-Clark classification is made up of the following three sectors:

1. Primary industries (agriculture, mining, fishing and forestry).
2. Secondary industries (manufacturing, construction and utilities).
3. Tertiary industries (commerce, transport, communication and services).

The Fisher-Clark formulation is more than a classification scheme; it is also a model of development. In the words of Postan (1971:86), "In Clark's formulation the tripartite order of sectors was transformed from a mere classification into an itinerary of economic progress. The lesson he taught was that economic progress had been achieved in the past and was to be achieved in the future by transferring resources first from primary occupations to secondary ones and, finally, from secondary to tertiary ones." Fundamentally, the motor that drives the transformative process is productivity. Thus, the key feature is the transfer of employment from industries with low productivity to those with high productivity--namely, from the primary sector to the secondary sector, or mainly from agriculture to manufacturing. However, the movement from secondary to tertiary employment is not a consequence of the higher productivity of the latter. Rather, it is the high level of per capita income that manufacturing generates that makes possible the demand for a variety of services.

The Fisher-Clark thesis has been subjected to various criticisms; i.e., the primary sector is not always low in productivity, and the sequence of employment enlargement is not always from primary to secondary but may be from primary to tertiary (Bauer and Yamey, 1951 and 1954; Triantes, 1953). There is, however, one criticism that is central to the task of developing a classification scheme; the heterogeneity of activities carried on within the tertiary sector. As long as the tertiary sector was small in size this could be tolerated, but with one-half or more of the labor force in this one sector the inadequacies of the three-sector scheme have become more and more intolerable. Consider only the differences between banking and domestic service, between medical and health services, and barber and beauty shops, or between accounting and entertainment. What do these services have in common? These industries differ along many dimensions, be it capital requirements, size of establishment, educational attainment of those employed in them, etc. While some service industries are positively associated with rising per capita income, others show a negative association. Clearly, services has increasingly become only a residual category.

Despite the many criticisms the Fisher-Clark model has received, it continues to be much used, once again testifying to the adage that criticism in itself, however telling, does not bring about the replacement of one conceptual scheme by another. To cite only a few of the recent examples of the usage of the three-sector model: Kuznets (1971) and Fuchs (1968) in economics, Miller in demography (1972), and Bell (1973) in sociology.

The sectoral allocation scheme developed by Browning and Singelmann (n.d.) and used in this monograph is presented not as a solution to all of the theoretical problems inherent in such a task, but simply as an advance over the Fisher-Clark formulation. Therefore, it deliberately is a modification and refinement, rather than a completely new formulation. It has been developed with data of the U.S.A. and therefore may not be as universal as one made up for countries of markedly different development or of different political systems. It is a six-sector scheme, designed to preserve some of the advantages of dealing with a limited number of aggregate categories. (Surely the population of the old three-sector scheme was due in part to its simplicity.) However, in recognition of the importance of within-sector variation, particularly since this is a relatively untried scheme, most of the analyses to follow break the six sectors down into 37 more detailed industries that allow much greater homogeneity of category.

The primary intent of the six-sector scheme of Browning and Singelmann, as presented in Table I-1, is to differentiate the Tertiary sector into more homogeneous units. Consequently, the first two sectors, here called Extractive and Transformative, are the same as the Primary and Secondary sectors of the Fisher-Clark scheme, even though some changes could have been made. For example, it is arguable that mining should be shifted from the Extractive to the Transformative sector, for in many respects (size of enterprise, capital investment, unionization, etc.) mining enterprises more closely approximate the organizational features of productive units in the Transformative sector. And within the latter sector, construction presents difficulties, because its mode of organization differs from the factory form that is

Table I-1

ALLOCATION SCHEME FOR SECTORS AND INDUSTRIES

I. *EXTRACTIVE*
1) Agriculture, Fishing and Forestry
2) Mining

II. *TRANSFORMATIVE*
3) Construction
4) Food
5) Textile
6) Metal
7) Machinery
8) Chemical
9) Miscellaneous Manufacturing
10) Utilities

III. *DISTRIBUTIVE SERVICES*
11) Transportation and Storage
12) Communication
13) Wholesale Trade
14) Retail Trade (except Eating and Drinking Places)

IV. *PRODUCER SERVICES*
15) Banking, Credit, and Other Financial Services
16) Insurance
17) Real Estate
18) Engineering and Architectural Services
19) Accounting and Bookkeeping
20) Miscellaneous Business Services
21) Legal Services

V. *SOCIAL SERVICES*
22) Medical and Health Services
23) Hospitals
24) Education
25) Welfare and Religious Services
26) Nonprofit Organizations
27) Postal Services
28) Government
29) Miscellaneous Professional and Social Services

VI. *PERSONAL SERVICES*
30) Domestic Services
31) Hotels and Lodging Places
32) Eating and Drinking Places
33) Repair Services
34) Laundry and Dry Cleaning
35) Barber and Beauty Shops
36) Entertainment and Recreational Services
37) Miscellaneous Personal Services

NOTE: See Appendix B for the identification of the 37 industries from the 1/100 Public Use Samples of 1960 and 1970.

typical in the Transformative sector. Since it doesn't fit much better in any other sector it was left in the Transformative sector.

The first of the four sectors that make up the old Tertiary sector is called the Distributive sector. It is the last of a three-stage sequence (Extraction-Transformation-Distribution) that signals the processing of goods from their most undifferentiated "primary" form to their distribution to the ultimate consumer. (Characteristically, this sequence is not a completely tidy one, for communication rarely deals with a tangible product.) The remaining three sectors cannot be linked to the sequence of the first three sectors, for they offer generally intangible services either to productive organizations in all other sectors or to the general public and as they cannot be ordered to form a sequence in their own right.

The fourth sector, Producer services, is made up mainly, if not exclusively, of industries that provide services to producers of goods or to individuals concernd with various forms of property. Producer services has been growing very rapidly in recent decades, partly because it did so from an initially small base. As pointed out by Fuchs (1968), activities such as accounting and advertising once were performed within firms, most often those in manufacturing. The emergence of these activities as separate industries is a reflection of the increasing division of labor. It also is linked to economies of scale, external economies, and in general to the greater degree of interdependence characteristic of a metropolitan-dominated form of economy.

Both Distributive and Producer services can be characterized as "goods-oriented" services, because they cater largely to goods or property as such or to matters related to property. They also can be characterized as "intermediate" sectors, between the first two "production" sectors and the last two "consumer" sectors. The last two sectors, Social and Personal services, are very predominantly "consumption-oriented." As such, they cater principally to the individual in some fashion, but it is precisely the different forms through which these services are rendered that necessitates their differentiation into two sectors. The fifth sector, Social services, includes health and medical, education, and government as its principal components. These services are "new" to the extent that their mass consumption is a relatively recent phenomenon, and the funds for their operation are dependent to a considerable degree on government revenues. In one form or another countries throughout the world, whatever their level of development, have responded to the exigencies of the welfare state by increasing the range and depth of their Social services. As such, this sector has largely a collective focus.

The last sector, Personal services, is the most heterogeneous of all sectors and the most like a residual category, but the services in this sector have in common an orientation to the individual consumer, and they are more responsive to supply and demand factors than are Social services. Generally, the size of establishment is relatively small, much more so than for Social services.

The Browning-Singelmann classification scheme was developed heuristically, for it was not derived from some theory of development, but rather from a dissatisfaction with the Fisher-Clark scheme. It was generated the better to understand the sectoral transformation of the labor force. Although worked out on the basis of data from the U.S.A., Singelmann (1974) has successfully applied it to six other developed countries (Canada, England and Wales, Germany, France, Italy and Japan) in a longitudinal study. It also has been used by Munoz (1975) and Oliveira (1975) in studies of the labor force of the largest metropolitan area (Mexico City) in a developing country, Mexico.

There is another basis to appraise the Browning-Singelmann scheme. Recently, and completely independently, two researchers in other parts of the world--Katouzian in England and Singer in Brazil--formulated sectoral allocation schemes. Katouzian (1970) entitled his article "The Development of the Service Sector: A New Approach," and he too was led to his categorization by his dissatisfaction with the Fisher-Clark scheme and its failure to differentiate the tertiary sector. But Katouzian maintains that the new classification can illuminate the developmental process. He divides the tertiary into three sectors: 1) complementary services; 2) new services, and 3) old services. The "complementary" services include banking, finance, transportation, wholesale and retail trade. Historically, Katouzian (1970:366-367) sees complementary services as closely linked to the rise in manufacturing following the Industrial Revolution:

> These services have been complementary to the growth of manufacturing production in two ways: as complementary factors to urbanization, and as necessary links to the process of round-about or capitalistic production. The growing demand for labour in industrial centres attracted migrants to urban areas, and factory production necessitated a high degree of urbanization. The growth of round-about production increased the range and complexity of intermediate goods and (with the underlying specialization process that was taking place) helped the conversion of local markets into a unified national market and expanded foreign trade--all demanding services included in this category. Therefore, as the rate of growth of industrial production increased, so did the rate of growth of these services, and vice versa.

The "new" services include education, health and entertainment. They are termed "new" because they reflect the mass consumption in industrial countries.

> The demand for these services is highly sensitive to the growth of *per capita* incomes, and it is also an increasing function of the amount of *per capita* leisure-time (especially if the community curve of the distribution of leisure time is not lopsided). (Katouzian, 1970:366).

Finally, the "old" services are those that "flourished before industrialization and whose importance and contribution has almost continuously declined since." Katouzian specifically includes domestic service but is quite vague on what other industries are to be included. It is likely that he has in mind what we call Personal services.

Paulo Singer, working within the context of a developing country, has provided a framework for sectoral analysis in his *Forca de trabalho e emprego no Brasil 1920-1969* (1971). He stresses the need for a broad interpretative approach ("structuralist-historical" as it now is known in Latin America) to understand changes in the labor force of Brazil for half a century. Also recognizing the need to deal with the heterogeneity of the tertiary sector, Singer divides it into three sectors:

(1) Production Services (commerce, transportation, communication, warehousing);
(2) Collective Consumption Services (government, health, education and other social services);
(3) Individual Consumption Services (liberal professions, domestic services, repairs and other personal services).

Singer shows in his longitudinal analysis of Brazil that each of these sectors had periods of relative strength and decline and like Katouzian he links these changes to those of the economic productive structure.

It strikes us that there are general similarities in the breakdown of the tertiary sector by Katouzian, Singer and Browning-Singelmann. The labels differ but the three classifications can be ranked as follows:

	Browning-Singelmann	Singer	Katouzian
1.	Distributive Producer Services	Producer Services	Complementary Services
2.	Social Services	Collective Consumption Services	New Services
3.	Personal Services	Individual Consumption Services	Old Services

Recalling that these allocations were made completely independently of one another, it is encouraging to find such a similarity in approach, even though there are differences in the allocation of specific industries to the sectors.

While it is encouraging to find others headed in the same direction, the best test of the utility of the Browning-Singelmann classification is how well it works when applied to actual data. In the pages that follow the reader will have ample opportunity to judge for himself how discriminating the scheme is when applied to the U.S. data, and how useful it is in permitting meaningful interpretations of the results.

THE ORGANIZATION OF THE STUDY

The perspective adopted in this analysis of the sectoral transformation of the labor force derives mainly from demographic and sociological origins and not from an economic one, except as it pertains to the analysis of the income distribution. Although it may be touched upon from time to time, particularly in Chapter II, the question of why the sectoral transformation occurred as it did--why some sectors and some industries grew while others declined--cannot be a central theme of this investigation. To do so would take us more fully into the realm of economics and a consideration of such factors as private and public sector investment allocation, the role of technology, of productivity, of labor demand and supply, and so on.

These are very important matters, but not ones we are competent to deal with. Nor, for that matter, is the nature of our main source of data appropriate for such a task. We depend, to a very large extent, upon the U.S. Bureau of the Census 1% Public Use Samples for the census years of 1960 and 1970. They are population censuses and not censuses of industries. Therefore, we have no indicators of investment on output but only of the employed labor force.

But what can be done with the labor force? A great deal, as we hope to demonstrate. Fuchs has expressed it as follows (1968:183): "A million dollar's worth of capital input can be said to have as much economic significance as a million dollars' worth of labor input. But labor is human and physical capital is not; it is appropriate, therefore, to give labor primary attention in any broad study concerned with total social development."

This report is organized to consider a series of distinct but interrelated questions: 1) How is the sectoral allocation to be made? 2) How is the long-term (1870-1970) and short-term (1960-1970) sectoral transformation to be depicted? 3) What is the relationship between industries and occupations? 4) Which characteristics of the labor force (primarily age, sex and ethnic status) are associated with which sectors and industries and how have their patterns changed between 1960 and 1970? Finally, 5) What are some of the consequences of sectoral allocation and sectoral change, specifically, for income distribution on the one hand and the nature of work and its meaning on the other?

Perhaps the best way to expand on the points raised by these questions is to show how they will be treated in subsequent chapters of this report.

Chapter II briefly provides the historical context for the more detailed analysis of the 1960-1970 period. The more one goes back in time the more unsatisfactory the data become, but it is possible to approximate the distribution of the six sectors for one hundred years. With this record we can show the movement out of the primary sector (already underway by 1870) and to show when the growth of the service sectors really accelerated. We can also relate these trends to the relevant changes in urbanization, output and female employment. In this way some of the questions raised by Katouzian and Singer can be put to the U.S. experience.

Chapter III takes up the present-day situation as reflected in the 1960 and 1970 data. First, we must address an important question that relates to the sectoral transformation, especially, into that of services. It has often been noted that services are characterized generally by more part-time work than other sectors. Conceivably, therefore, the large shifts into the services could be misleading, for while there are important changes in employment, these changes may greatly be reduced if the actual labor input is taken into account. This can be done by deriving the yearly hours per worker, a combination of hours per week and weeks per year. This is computed for the six sectors and for the 37 sub-industries.

The second part of Chapter III takes up a different topic but one, like the question of employment versus labor input, that is relevant to material in subsequent chapters. Is the sectoral transformation primarily a change whereby people move from one industry sector to another, or is it mainly the result of a larger proportion of new labor force entries going into some rather than other industries? Unfortunately, census data do not permit a full test of this matter, but the questions new to the 1970 census on what the individual was doing five years ago provide some findings that bear on the problem.

Chapter IV, like the preceding two, is concerned with a structural feature of the industry sectors and their transformation. The primary objective is to determine how the 1960-1970 change was achieved through specific age groups. Age distributions for the two periods are examined and age-sex pyramids graphically indicate the many forms the age distribution can take, but the major technique is net shift analysis, which permits comparison of expected versus actual age group changes. As with the inter-employment shifts we wish to know, once we control for the growth of the entire labor force in every one of the age categories, whether the proportionate growth of some of the service sectors is accomplished mainly through the young entrants or whether it is diffused throughout all age groups?

Chapter V is the final chapter in the structural section of the report. Here we take up the difficult problem of the interrelation of industry and occupation. It is strange that so little attention has been given to the problem, for it would appear obvious that changes in industry structures should be reflected in occupational structures and vice versa, but, exception for a few cases, the industry and occupational structures are considered separately rather than jointly. Following the lead of Palmer and Miller (1949) the change in the occupational composition from 1960 to 1970 is decomposed into three components: 1) that attributable to growth of the total labor force (were the 1960 occupational composition to hold for 1970); 2) that attributable to the industry shift effect (the differential demand for occupations by industries growing at different rates); and 3) the occupational shift effect (the changing occupational requirements within industries). This approach, which is a variation of the shift share approach used in Chapter IV, does not exhaust the subject, but it is believed to be a step in the right direction.

The first five chapters concern themselves to a large extent with the nature of the sectoral allocation and the "how" of its transformation. They are largely descriptive in nature but they are not "merely" descriptive, for it is essential that we know how a thing works if we are better to understand its interrelationships and its consequences. The next two chapters are concerned with the compositional features of sectors, the "who" aspect.

Chapter VI takes up the sexual division of labor by sexes, a topic of much contemporary concern and one especially important for the analysis of services. As will be shown, female employment is largely concentrated in services, particularly the Producer, Social and Personal sectors. Particular attention is devoted to the question of whether the increasing concentration of women in service industries has provided greater opportunities for entry into higher-status occupations. The distinction between occupational and industry sex-typing is made and the consequences for women's work is drawn.

The following chapter on minorities (VII) continues the crucial matter addressed to females: to what extent does the sectoral transformation of the labor force improve the work status of minorities? The main analysis is carried out for black-white relationships by sex, but at the end of the chapter a comparison of two minorities who are of roughly comparable socioeconomic status, Blacks and Mexican Americans, is made. This last examination is limited to the five Southwestern states, because these are the states where Mexican Americans mainly are found and where data for them are available.

The eighth chapter addresses a most important problem: the extent to which the shift of employment towards Social and Personal services and its accompanying changes in terms of occupational structure and the position of females and minorities in the labor force are reflected in the distribution of earnings. First, the change in earnings inequality between 1959 and 1969 will be described. Second, the relative merits of the human capital and the sectoral approaches as competing explanations of the observed changes are assessed. Finally, we will analyze the differences in the returns on the variables in the human capital model as applied to industries by sex and race.

Like Chapter VIII, the final chapter of the report, IX, is concerned mainly with some of the consequences of the sectoral transformation. Rather than attempting a summary of what has gone before in the first part, we elect to reconsider some of the more important findings in terms of their implications for manpower policies.

A second section of Chapter IX is frankly speculative in nature, for it moves more completely into a sociological consideration of the sectoral transformation of the emergence of the service society, a consideration that necessarily goes beyond the data of the report. As such, it is intended to show the possibilities of relating industry sectors with social structure through such factors as the nature of social interaction when consumers must cooperate in the production of a service, the impact on the class structure when two-thirds of the labor force are in services, and the meaning of alienation within the context of a service society.

Chapter II

THE HISTORICAL CONTEXT OF THE SECTORAL TRANSFORMATION, 1870 to 1970

Social and economic changes are general phenomena of all countries and all times but they do not automatically occur within convenient time-spans such as census intervals. Thus, while it is useful to examine certain changes for a given time period, these changes often have started at an earlier time and do not always terminate at the end of the period that is under investigation. The purpose of this chapter is the discussion of the labor force changes during the last one hundred years in the context of which the 1960-1970 decade can be seen. This is not to say that every change that occurred in the structure of the labor force during the 1960's began toward the end of the last century. That certainly would be an erroneous assumption. The point here is that the ten-year period which we put under the magnifying glass of our investigation should not be seen in isolation but rather in its historical context. To this end, we shall sketch a general outline of the changes which the labor force has undergone, primarily in terms of its industry and occupational structure. In addition, other aspects related to these changes, such as urbanization and the increased labor force participation of women, will briefly be addressed. This is not the place, however, to account for the reasons for the way in which the structure of the labor force became transformed. This in itself would be an investigation in its own right, but more important, we do not think that our tools could satisfactorily accomplish that task. Instead, the reader is referred to studies that have addressed this subject (e.g. Kuznets, 1966; 1971; Abramovitz, 1956; Bain, 1966; Denison, 1967; Fabricant, 1942; and Kendrick, 1961).

Before turning to the analysis of the sectoral transformation of the labor force between 1870 and 1970, a word of caution must be said about the nature of the labor force data reported in Table 1. Census data for the industry allocation of the labor force prior to 1920 are very general and do not provide information on the level of detailed industries. The best time series for the distribution of the labor force by industry prior to 1920 has been reconstructed by Salomon Fabricant and it forms the basis of Table II-1. Even these data, however, are too crude to permit an exact differentiation of the labor force into the six industry sectors used throughout this study. But they at least indicate the magnitude of most industry sectors for the 1870-1920 period.

The sectoral transformation of the labor force. In just one hundred years the labor force of the United States changed from an agricultural basis to a service basis. In 1870 one-half of the labor force worked in agriculture, but a century later services together accounted for almost two-thirds of total employment. How did this transformation occur? The description of these changes is the subject matter of this section.

By 1870, stimulated by the Civil War, the industrialization of the U.S. economy was well under way. The expanding rail transportation network had opened up additional territories and facilitated exchanges between the states. A national banking system was created permitting a less restricted flow of capital. As Bagwell and Mingay (1970: 165) pointed out, however, it was most of all improved technologies and their application to the vast natural resources of the nation that propelled the growth of the U.S. economy during the last third of the nineteenth century.

The move out of agriculture is one of the most striking features revealed in Tables II-1 and II-2. Once it began, it continued unabated throughout the century, and actually has accelerated since 1940. By 1970 only 3.7 percent of the nation's labor force was engaged in agriculture. Considering the fact that these 2.7 million people not only provide food for 205 million Americans, but also for persons living in many other countries, the decline in the need for agricultural labor must remain one of the greatest achievements in economic development. It demonstrates how mechanization, innovations in fertilizers and seeds, credit and concentration of land ownership have enabled continuous increases in productivity to take place.

In contrast to some other countries in Western Europe, such as Belgium or Germany, the labor force in the United States has never been dominated by the Transformative sector. At no time since 1870 did the Transformative sector account for more employment than the service industries taken together. In fact, the ratio of service employment to Transformative employment increased substantially, from 1.03 in 1870 to 1.56 in 1970.

In general, the share of total employment in manufacturing expanded during each census year since 1870, although the growth was not always substantial. During the 1960's, however, employment in manufacturing industries has increased less rapidly than the total labor force. Since this trend already started in Canada during the 1950's, there is reason to believe that around 1960 manufacturing reached its largest share of total employment. From now on manufacturing is likely to account for a slightly decreasing proportion of the labor force.

But the changes in the share of employment in the Transformative sector reveals only half of the story. The data in Table II-3 demonstrate that manufacturing production has increased much more remarkably since 1870 than manufacturing employment. Moreover, the rate of increase in manufacturing production during the 1960's exceeded that of the previous decade, despite the fact that the growth rate of manufacturing employment declined during that period. Although the emphasis of this project is on the changes in employment, the data for manufacturing production suggest that output and productivity trends of a particular industry are not always exactly reflected in employment trends. As was noted in the case of agriculture, the number of persons employed in a given industry does not always correspond to the magnitude of its outputs.

We now turn to the discussion of the growth of services and their differentiation during the last one hundred years. In 1870 domestic service was the largest single service industry; it employed twice as many persons as did all Social services together. Over the decades, however, the structure of service employment underwent fundamental changes.

We noted in the first chapter that Katouzian (1970) viewed Distributive and Producer services (the "complementary services" in his terminology) as being closely linked to the production industries of the Extractive and Transformative sectors. These services are, for the most part, of an intermediate nature

TABLE II-1

PERCENTAGE DISTRIBUTION OF GAINFUL WORKERS BY INDUSTRY SECTORS AND MAJOR INDUSTRY GROUPINGS: UNITED STATES, 1870-1920

	Industry Sectors and Major Industry Groupings	1870	1880	1890	1900	1910	1920
I.	EXTRACTIVE	52.3	52.4	45.2	40.7	35.0	30.6
	Agriculture, Forestry & Fishery	50.8	50.6	43.2	38.1	32.1	27.6
	Mining	1.6	1.8	2.0	2.6	2.9	3.0
II.	TRANSFORMATIVE	23.5	23.3	26.3	27.9	29.1	31.7
	Construction	5.9	4.8	6.1	5.8	6.4	5.3
	Manufacturing	17.6	18.4	20.2	22.1	22.8	26.4
III.	DISTRIBUTIVE SERVICES	11.5	12.1	14.9	16.9	18.2	20.0
	Transportation & Public Utilities	5.0	5.0	6.5	7.3	8.8	10.2
	Trade	6.5	7.1	8.4	9.6	9.3	9.8
IV.	PRODUCER SERVICES	1)	1)	1)	1)	1.4	1.9
	Finance and Real Estate	1)	1)	1)	1)	1.4	1.9
V.	SOCIAL SERVICES	3.4	3.8	4.5	5.1	[illegible].1	7.7
	Education	1.5	1.9	2.2	2.3	2.5	2.8
	Government	0.8	0.8	0.8	1.0	1.5	2.2
	Other Professional Services	1.1	1.1	1.5	1.7	2.1	2.6
VI.	PERSONAL SERVICES	9.3	8.4	9.2	9.4	10.2	8.1
	Domestic Service	7.4	6.3	6.5	6.1	6.0	4.1
	Personal Services	2.0	2.1	2.7	3.4	4.2	4.0
	TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

1) The percentage for "finance and real estate" is included in "trade" for the period 1870-1900.

SOURCE: Adapted from U.S. Bureau of the Census, Historical Abstracts of the United States: From Colonial Times to 1957, Washington, D.C., 1960: Table D57-71.

TABLE II-2

PERCENTAGE DISTRIBUTION OF THE LABOR FORCE BY INDUSTRY SECTORS AND INTERMEDIATE INDUSTRY GROUPS, 1920 - 1970

Sectors and Industries	1920	1930	1940	1950	1960	1970
I. *EXTRACTIVE*	*28.9*	*25.4*	*21.3*	*14.4*	*8.1*	*4.5*
1) Agriculture	26.3	22.9	19.2	12.7	7.0	3.7
2) Mining	2.6	2.5	2.1	1.7	1.1	0.8
II. *TRANSFORMATIVE*	*32.9*	*31.5*	*29.8*	*33.9*	*35.9*	*33.1*
3) Construction	32.9	6.5	4.7	6.2	6.2	5.8
4) Food		2.3	2.7	2.7	3.1	2.0
5) Textile		4.2	2.6	2.2	3.3	3.0
6) Metal		7.7	2.9	3.6	3.9	3.3
7) Machinery			2.4	3.7	7.5	8.3
8) Chemical		1.3	1.5	1.7	1.8	1.6
9) Misc. manufacturing		9.0	11.8	12.3	8.7	7.7
10) Utilities		0.6	1.2	1.4	1.4	1.4
III. *DISTRIBUTIVE SERVICES*	*18.7*	*19.6*	*20.4*	*22.4*	*21.9*	*22.3*
11) Transportation	7.6	6.0	4.9	5.3	4.4	3.9
12) Communication		1.0	0.9	1.2	1.3	1.5
13) Wholesale	11.1	12.6	2.7	3.5	3.6	4.1
14) Retail			11.8	12.3	12.5	12.8
IV. *PRODUCER SERVICES*	*2.8*	*3.2*	*4.6*	*4.8*	*6.6*	*8.2*
15) Banking	2.8	1.3	1.1	1.1	1.6	2.6
16) Insurance		1.1	1.2	1.4	1.7	1.8
17) Real Estate		0.6	1.1	1.0	1.0	1.0
18) Engineering		---	1.3	0.2	0.3	0.4
19) Accounting		---		0.2	0.3	0.4
20) Misc. business serv.		0.1		0.6	1.2	1.8
21) Legal services		---		0.4	0.5	0.5
V. *SOCIAL SERVICES*	*8.7*	*9.2*	*10.0*	*12.4*	*16.3*	*21.9*
22) Medical services	8.7	---	2.3	1.1	1.4	2.2
23) Hospitals		---		1.8	2.7	3.7
24) Education		---	3.5	3.8	5.4	8.6
25) Welfare		---	0.9	0.7	1.0	1.2
26) Nonprofit		---		0.3	0.4	0.4
27) Postal services		0.6	0.7	0.8	0.9	1.0
28) Government		2.2	2.6	3.7	4.3	4.6
29) Misc. social serv.		6.3	---	0.1	0.2	0.3
VI. *PERSONAL SERVICES*	*8.2*	*11.2*	*14.0*	*12.1*	*11.3*	*10.0*
30) Domestic services	8.2	6.5	5.3	3.2	3.1	1.7
31) Hotels		2.9	1.3	1.0	1.0	1.0
32) Eating & drinking			2.5	3.0	2.9	3.3
33) Repair		---	1.5	1.7	1.4	1.3
34) Laundry		---	1.0	1.2	1.0	0.8
35) Barber & beauty shop		0.9	---	---	0.8	0.9
36) Entertainment		0.9	0.9	1.0	0.8	0.8
37) Misc. personal serv.		---	1.6	1.2	0.4	0.3
TOTAL LABOR FORCE	*100.2*	*100.1*	*100.1*	*100.0*	*100.1*	*100.0*

SOURCES:

1920: U.S. Department of Commerce, Bureau of the Census. 14th Census of the United States, 1920. Volume IV, Table 2.

1930: U.S. Department of Commerce. Bureau of the Census. U.S. Census of Population, 1930. Volume V - General Report on Occupations. U.S. Government Printing Office, Washington, D.C., 1933. Chapter 7, Table 1.

1940: U.S. Department of Commerce. Bureau of the Census. U.S. Census of Population, 1940. Volume III, Part 1, Table 74. Washington, D.C.: Government Printing Office, 1943.

1950: U.S. Department of Commerce. Bureau of the Census. U.S. Census of Population, 1950. Volume IV - Special Reports, Part I, Chapter D: Industrial Characteristics. Table 1. U.S. Government Printing Office, Washington, D.C., 1955.

1960: U.S. Department of Commerce. Bureau of the Census. U.S. Census of Population, 1960. Subjects Reports: Industrial Characteristics. Final Report PC(2)-7F, Table 2. U.S. Government Printing Office, Washington, D.C., 1967.

1970: 1/100 Public Use Sample.

Table II - 3

INDEX OF MANUFACTURING PRODUCTION AND PER CAPITA NATIONAL INCOME, 1870 TO 1970

Year	Manufacturing Production (1947-49=100)	Income (1960 dollars)
1870	4	340
1880	7	499
1890	12	592
1900	17	757
1910	29	927
1920	39	1,050
1930	48	1,170
1940	66	1,364
1950	113	1,836
1960	163	2,132
1970	262	3,002

Sources: Manufacturing Production

1870-1950	U.S. Bureau of the Census. Historical Statistics of the United States - Colonial Times to 1957. Washington, D.C., 1960. Series P 11-13.
1960	U.S. Bureau of the Census. Historical Statistics of the United States. Continuation to 1962 and Revisions. Washington, D.C., 1965. Series P 11.
1970	Economic Report of the President, 1973. Table C-34 (adjusted to 1947-49 base years)

National Income

1870-1960	Fuchs, 1968: 30.
1970	Economic Report of the President, 1973. Table C-14 (adjusted to 1960 dollars).

(Greenfield, 1966; Machlup, 1962). They primarily cater to establishments of other industries and do not serve the individual consumer directly. It must be noted, however, that this characterization fits some Distributive and Producer services (such as transportation and advertising) better than others (e.g. retail trade).

With the expansion of the manufacturing sector, the demand for these services increased as well. Consider the example of transportation. A good transportation network has often been mentioned as a necessary condition for successful industrialization (e.g., Davis, et al., 1972; Easterbrook and Aitken, 1956; Dillard, 1957). But the increased demand of manufacturing industries for transportation to move their products was a strong impulse for expansion. To that extent, then, the growth of employment in transportation during the 1870-1920 period reflects the extension of the transportation network as well as the increase in the demand for transportation by the new and expanding industries primari within the manufacturing sector.

But, as Table II-2 shows, transportation did not continue its relative growth in employment during the 1920-1970 period. While the first fifty years (1870-1920) saw a doubling of transportation's share of the total labor force, the next fifty saw a large, if uneven, decline. Two reasons can be given for the decline. For one, the last fifty years brought with them a drastic change in the nature of transportation. It was during this time that the automobile became the favorite mode of getting from one place to another. As a result, the transportation of persons by public means became less important. Second, once a comprehensive transportation network is created -- this is particularly true for railroads -- it is capable of handling large increases in demand without corresponding increases in employment. This is to a large extent the result of technological advances, which permit various economies, thereby increasing productivity many times (see Cottrell's article (1951), "Death by Dieselization," as a good example for the influence of technology on transportation).

The relationship between the Transformative sector and the various Distributive and Producer services is quite complex and differs from one industry to the next, although in general their growth is linked to the development of Transformative industries. Communication industries, for example, have increased their proportion of the labor force continuously, but owing to their being a high capital-intensive industry, labor is relatively unimportant.

The growth of employment in trade, rising from about 6% in 1870 to 17% in 1970, is one of the more impressive changes in Tables II-1 and II-2. The reasons for this proportionate gain is not immediately obvious, since it could be assumed that trade would simply maintain its relative share of the labor force but would not nearly triple its share.

The century under consideration witnessed the full emergence of the U.S.A. as a mass consumer society and trade has been the means by which the enormous growth of production in both the Extractive and Transformative sector has been delivered to the consumer. This linkage between trade and the production of goods indicates that it must not necessarily be labor that is related but it often is output. As long as goods are produced, they need to be sold. In this sense, it matters relatively little how many persons the Transformative sector employs. As we pointed out above, the proportionate decline of employment in the Transformative sector during the 1960's, for example, has not meant that output during that time declined.

Although the data for Producer services are very limited for the time prior to 1920, its development nevertheless is most interesting, for it points to an additional aspect of the sectoral transformation of the labor force: the division of labor. A great deal of work that now is performed by the various Producer services originally was carried out within goods-producing industries themselves. Advertisement is a good example. In the early part of the industrialization process, firms who wanted to advertise used their own employees to do so. As advertising became more important, both in terms of its impact on sales and as proportion of the firm's budget, it also had to become more specialized. Once the demand for this service could guarantee a certain volume, advertising was established as an independent industry. Other Producer services such as accounting and bookkeeping fit the example of advertising very well.

Most impressive, however, was the employment growth of Producer services during the 1950-70 period. In these two decades alone, they increased their share of the total labor force by over 80 percent. This impressive growth rate, in part, was due to the expansion of banking and insurance services and their aggressive attempts to gain as many customers as possible. Fifty years ago few people had personal checking accounts and the familiar "charge-it-on-your-credit-card" was not yet part of the American way of life. It therefore is not surprising that according to Greenfield's (1966) estimate, over-half of the employment in banking and insurance serves individual consumers, whereas the remaining employment caters to other establishments. Again, the continued expansion of all Producer services during the 1960's occurred while employment in the Transformative sector decreased in proportionate terms. The growth of employment in the Producer services sector is, as in the case of trade, not dependent on the share of employment in the Transformative sector. In effect, part of the proportionate decline of Transformative employment could be the result of the division of labor that has favored the expansion of Producer services.

Remarkable as was the growth of Producer services after 1950, it is surpassed by the expansion of Social services. The trends of these two service sectors are very similar: although they increased their share of total employment during each decade over the past one hundred years, their main growth came during the 1950-70 period. In 1970 Social services accounted for 22 percent of the total labor force and by 1980 one of every four employed persons can be expected to work in this sector.

The four largest industries in the Social services sector are medical and health services, hospitals, education, and government. It was pointed out in the introductory chapter that Social services correspond to Katouzian's (1970) "new services." These services are new in the sense that they have become available to most parts of the population. This does not mean, however, that all population groups have equal access to health services and education; socioeconomic differentials still prevail. But in earlier times these services were available only to the privileged classes, and the vast majority of the population was excluded. As Table II-2 shows, the big expansion of medical, health, and educational services is very recent; it was during the 1950's and 1960's that they became accessible to more and more people. Social welfare legislation growing out of the New Deal, the Great Society programs of the

Kennedy and Johnson Administrations, and the Civil Rights legislation, all have contributed to the expansion of employment in these services.

Besides these more centrally directed and planned influences on the growth of Social services, a very important factor has been the rising per capita income of the United States population (see Table II-3). As per capita increased, the disposable income of individuals became larger which enabled people to spend larger proportions of their budget on items such as health care and education. This situation is not specific to the United States, but exists in the industrialized countries in general. For example, it was found in a study of seven industrialized countries that the proportion of total employment in Social services is positively related to per capita income (Singelmann, 1974). As per capita income continues to grow, we can expect the demand for Social services to increase also, although it is not likely (if only because of technological advances in the Social services themselves) that the share of total employment in Social services will expand beyond thirty percent for some time.

Finally, Personal services, the "old services" in Katouzian's (1970) scheme, experienced very uneven growth rates during the last hundred years. But this situation primarily is the result of the decline of domestic service from 7.4 to 1.7 percent of the total labor force. In contrast, the remainder of the Personal services sector expanded in almost all decades of the 1870-1970 period. Thus, Katouzian's (1970) statement that in the course of economic growth the share of the labor force in old services declines, mainly pertains to domestic services (although some other personal service could be included). But two Personal services differ from this trend: hotels and lodging places, and eating and drinking places. Both service industries increased their share of total employment from 2.9 percent in 1930 to 4.3 percent in 1970. By 1970 they accounted for almost one-half of all employment in Personal services, excluding domestic service.

Hotels and eating places respond similarly to increases in per capita income as do Social services. Once the disposible income of individuals reaches a certain level, the service of preparing food, for example, can be afforded especially food sold through quick-order outlets. In that sense, the emergence of these Personal services reflects the continued division of labor whereby less and less work is performed in the household itself, and more labor is done within formal organizations.

The preceding discussion not only showed how the labor force during the past one hundred years have become overwhelmingly non-Extractive, but it was noted that among the non-Extractive industries, important changes took place. By far the most dynamic industries in that time period were the Social and Producer services. Since this trend is a relatively recent one, it can be expected that it will continue through 1980 at least, although the rate of expansion is likely to slow down as compared with the 1950-1970 period.

The occupational structure. The complex and sweeping changes in the industry structure of the labor force during the past one hundred years have brought with them fundamental changes in the type of work that people do. This is not the place to elaborate on the nature of the interdependence of the industry structure and the occupational structure (that discussion is the subject of Chapter V in this report). The following examples may therefore suffice for a demonstration of how changes in the industry structure can be related to occupational changes. As a consequence of the continuous decline of agriculture, fewer and fewer farmers and farm laborers were needed in the labor force. Similarly, as Social and Producer services expanded in this century, professional, clerical, and service occupations also experienced a disproportionate rate of growth. This section examines the changes in the occupational structure of the labor force since 1900. The discussion should help to put the analysis of the relationship between industry and occupation within its historical context.

In 1900 farm workers made up almost two-fifths (37.9 percent) of the labor force (Table II-4). One-third (35.8 percent) of the labor force consisted of manual workers. White-collar occupations made up only 17.6 percent of total employment. Particularly noteworthy was the small share of employment (only 3.0 percent) in clerical occupations in 1900.

Within seventy years the character of the labor force changed from the domination of blue-collar and farm occupations to a concentration of employment in white-collar positions. Consider the following changes: farm workers as proportion of total employment decreased by about 90 percent; professionals almost quadrupled; and clerical occupations increased six times,to become the single largest occupational category. The only occupational category outside white-collar work that increased its share of total employment continuously during the past seventy years was service workers other than private household, and this category is found mostly in Personal and Social services. In 1970 white-collar occupations for the first time employed more persons than manual and service occupations combined; almost one-half of total employment was in professional,managerial, sales and clerical positions.

Manual occupations, in contrast, have been growing more slowly than total employment since 1950. The proportionate decline of laborers is the clearest; their share of total employment has decreased steadily since 1900; there were fewer laborers in 1970 than 70 years earlier. With the growth of employment in the Transformative sector until the sixties, craftsmen and operatives grew more rapidly than total employment.

Although the foregoing discussion clearly shows that the growth of services contributed significantly to the expansion of white-collar occupations, there are also occupational changes within industries that are reflected in the overall changes in the occupational structure. Certainly, the occupational requirements of a certain industry change over time, for example in response to technological advances.

Urbanization. One of the most pervasive consequences of the sectoral transformation from agricultural to service employment is urbanization. As agricultural work declined, people left the farms and migrated to the cities. This movement is clearly reflected by the data in Table II-5: the percent urban of the total population increased from about one-quarter to three-quarters of the population.

The subject of urbanization is too broad a topic to be discussed here in all its dimensions, and much valuable information about it is readily available (e.g., Taeuber and Taeuber, 1971). However, one aspect needs to be

TABLE II-4

PERCENTAGE DISTRIBUTION OF THE LABOR FORCE BY MAJOR OCCUPATIONAL GROUPS, 1900-1970

Occupational Groups	1900	1910	1920	1930	1940	1950	1960	1970
White Collar Workers	17.6	21.3	24.9	29.4	31.1	36.6	42.2	48.8
Professional, technical, and kindred workers	4.3	4.7	5.4	6.8	7.5	8.6	11.4	15.3
Managers, officials, and proprietors except farm and mine	5.8	6.6	6.6	7.4	7.3	8.7	8.5	8.5
Clerical and kindred workers	3.0	5.3	8.0	8.9	9.6	12.3	15.0	18.0
Sales workers	4.5	4.7	4.9	6.3	6.7	7.0	7.4	7.3
Manual and Service Workers	44.9	47.7	48.1	49.4	51.5	51.6	51.5	48.2
Manual	35.8	38.2	40.2	39.6	39.8	41.1	39.7	35.5
Craftsmen, foremen, and kindred workers	10.5	11.6	13.0	12.8	12.0	14.1	14.3	13.8
Operatives and kindred workers	12.8	14.6	15.6	15.8	18.4	20.4	19.9	17.3
Laborers, except farm and mine	12.5	12.0	11.6	11.0	9.4	6.6	5.5	4.4
Service	9.0	9.6	7.8	9.8	11.7	10.5	11.8	12.7
Private household workers	5.4	5.0	3.3	4.1	4.7	2.6	2.8	1.4
Other than private household	3.6	4.6	4.5	5.7	7.1	7.9	9.0	11.3
Farm Workers	37.9	30.9	27.0	21.2	17.4	11.8	6.3	3.1
Farmers and farm managers	19.9	16.5	15.3	12.4	10.4	7.4	3.9	1.8
Farm Laborers and foremen	17.7	14.4	11.7	8.8	7.0	4.4	2.4	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

SOURCES: 1900-1960 Taenber and Taenber, 1971;182.
1970 1/100 Public Use Sample.

Table II-5

URBAN POPULATION IN THE UNITED STATES: 1870-1970

Year	Percent Urban
1870	25.7
1880	28.2
1890	35.1
1900	39.7
1910	45.7
1920	51.2
1930	56.2
1940	56.5
1950	64.0
1960	69.9
1970	73.5

SOURCES: 1870-1920: Ward, 1971:6.
1930-1960: Taeuber and Taeuber, 1971:46.
1970: U.S. Bureau of the Census, 1973:Table 189.

Note: The definition of "urban" changed in 1950.

addressed here and that is the urban character of services. Services, even more than Transformative industries, are concentrated in urban areas. The urban character of services is, to a large extent, due to the fact that services generally cannot be stored and transported. Although manufacturing industries, too, prefer to be located so as to have access to consumer markets, the cost of transportation is only one factor among other considerations, such as availability of labor, resources, and tax laws. In the case of services, most of these considerations do not apply. Due to the intangible nature of most services, they must be consumed at the moment of production, as in the case of education or medical services. (There are certainly exceptions to this generalization, the case of insurance companies being one of them, but on the whole this characterization fits.) With an increasing population, many services become specialized. A city needs a certain population site before an airport becomes viable. While small communities at the most have a general hospital, larger urban centerscan support more specialized medical serviees such as a burn-treatment center. Education in general follows a similar rule. The main exception to this is the location of some state universities, which often are located in relatively small places, such as Bloomington, Indiana or Boulder, Colorado. But in many of these cases, the decision to locate a university in a certain community has been politically determined, and does not always reflect the interplay of supply and demand.

Women in the labor force. The last years have seen a tremendous increase in the number of studies on women in the labor force (see Chapter VI for a more detailed discussion of this subject). Many of these studies undoubtedly had been motivated by the fact that the percent female of total employment has increased very remarkably during the past fifty years (Table II-6). The fact of the increased labor force participation touches upon the sectoral transformation insofar as women are much more concentrated in services than in any other industries. It is not only in Personal services that the percent female of total employment exceeds that for the entire labor force; the same is true for Social and Personal services. Moreover, the concentration of women in services has increased rather than decreased over time. The reasons for this are not all that clear, particularly since this high concentration is not to be found in many other industrialized countries (Singelmann, 1975). As Fuchs (1968) noted, services are characterized by a higher degree of part-time work than Transformative industries. Since women account for a disproportionately high share of part-time work, they might prefer to work in services. On the other hand, following the reasoning of the dual labor market theory, one could argue that women are channelled into services owing to the perceptions employers have of women. Whatever the reasons, the concentration of women in service industries is impressive, and it will be discussed in detail in Chapter VI.

Before turning to the various aspects of the sectoral transformation of the labor force during the decade from 1960 to 1970, as outlined in the introduction, we need to address one additional question: To what extent were the 1960's an exceptional period? This has an important bearing on the extent to which the findings of this study can be generalized.

By and large, the economy fared well during the 1960-70 decade. The Consumer Price Index increased at an average rate of 3.1 percent during the 1960's as compared to 2.1 percent in the previous decade. Unemployment also was relatively low. The average unemployment rate between 1960 and 1970 was 4.8 percent, slightly up from 4.1 percent during the 1950's. As Table II-7 shows,

Table II-6

RATES OF FEMALE LABOR FORCE PARTICIPATION AND PERCENT FEMALE OF TOTAL LABOR FORCE, 1890-1970

Year	Participation Rate	Percent Female
1890	18.2	17.0
1900	20.4	18.1
1910	25.2	20.9
1920	23.3	20.4
1930	24.3	21.9
1940	25.4	24.4
1950	29.0	27.5
1960	34.5	32.5
1970	43.4	37.8

SOURCE: Participation Rates:
1890 Bancroft, 1958:Table D-1.
1900-1960 Oppenheimer, 1970:3.
1970 U.S. Bureau of the Census, 1971.

Percent Female:
1890-1900, 1920-1950 Bancroft, 1958:Table D-1.
1910 U.S. Bureau of the Census, 1943:Table 8.
1960 U.S. Bureau of the Census, 1967:Table 2.
1970 U.S. Bureau of the Census, 1973:Table 32.

Table II-7

UNEMPLOYMENT RATES AND CONSUMER PRICE INDEX, 1950-1970

Year	Unemployment Rates	Consumer Price Index (1967 = 100)
1950	5.3	72.1
1951	3.3	77.8
1952	3.0	79.5
1953	2.9	80.1
1954	5.5	80.5
1955	4.4	80.2
1956	4.1	81.4
1957	4.3	84.3
1958	6.8	86.6
1959	5.5	87.3
1960	5.5	88.7
1961	6.7	89.6
1962	5.5	90.6
1963	5.7	91.7
1964	5.2	92.9
1965	4.5	94.5
1966	3.8	97.2
1967	3.8	100.0
1968	3.6	104.2
1969	3.5	109.8
1970	4.9	116.3

SOURCE: 1973 Economic Report of the President. Tables C-26 (Unemployment) and C-44 (Price Index).

the unemployment rate went down from 6.7 percent in 1961 to 3.5 percent in 1969, which approximately corresponds with the build-up of the Vietnam War. By 1970 unemployment was up again to almost 5 percent. In sum, the data suggest that on the basis of the two economic indicators, unemployment and the Consumer Price Index, one can conclude that the economic trends during the 1960's were more or less a continuation of those of the 1950-60 decade.

More changes happened politically. Largely as a result of our involvement in Vietnam, the population became very divided in terms of political attitudes. Universities saw frequent demonstrations and various coalitions were formed to oppose the foreign policy of the Johnson Administration. At the same time, attention was called to the domestic problems of poverty and discrimination (Harrington, 1964). Several important social welfare programs were passed during the Kennedy-Johnson administrations (see Piven and Cloward, 1973). This legislation in conjunction with the various Civil Rights acts meant a significant progress in the situation of the nation's poor. It was also during the 1960's that the cities experienced tremendous unrest which made the need for social reforms all the more pressing.

These events are clearly unique to the 1960's. But in an sense, when is history not exceptional? Compared with many of the previous decades, however, the 1960's could be considered as relatively "normal." The 1920's were influenced by the consequences of World War I, the 1930's were the decade of the Great Depression; World War II dominated the 1940's, and its aftermath -- the Cold War -- the 1950's.

The sectoral transformation of the labor force during the 1960's represents, in its various manifestations, the continuation of a trend that had already started earlier. In that sense, then, we consider the decade from 1960 to 1970 as a useful time period for our purposes.

Chapter III

LABOR INPUT AND WORK CONTINUITY

There are many different forms of employment. Some persons, for example, work full time throughout the year, whereas others work intermittently for only part of the year. A third group still may work part time but continuously and, finally, there are those who only work part time for a few weeks out of every year. Moreover, a full time worker who is employed during the entire year does not necessarily work in the same industry for that time period but could well be employed in a number of different industries.

While the decision to work a given amount of time often is made by the worker, there are also requirements on the part of the industry. It is the purpose of this chapter to examine the differences between sectors and industries in terms of labor input and continuity of employment. More specifically, the chapter is divided into two parts: Part 1 examines the nature of work scheduling and labor input, and Part 2 analyzes the movement of employment among industry sectors for the 1965-1970 period.

PART I: LABOR INPUT AND WORK SCHEDULING

The sectoral transformation of the labor force during the past one hundred years has meant a profound change in the kind of work that is required. Half of the labor force worked in agriculture one hundred years ago, but in 1970 this industry accounted for a mere 3.7 percent of total employment. In contrast, almost two of every three persons employed today work in a service industry of one kind or another. While this trend is very clear in terms of *employment*, there has been some implicit doubt about the magnitude of this change in terms of labor *input*. In other words, the distribution of workers among industries will not necessarily correspond with the distribution of labor as measured by the number of yearly hours worked. The reason for this lies in the fact that industries differ in their utilization of labor. Some industries such as domestic service are characterized by a large proportion of part-time workers, whereas other industries require mostly full-time employment, as do most durable goods industries.

In particular, attention has been called to the fact that services are characterized by a high proportion of part-time employment. For this reason it is assumed that there is less of a concentration of hours worked in services than is the case of employment. Adam Smith, for example, noted that employment in manufacturing was much more "industrious" than that in services, referring largely to the number of hours worked (Smith, 1937: 78). According to Fuchs, services differ from goods-producing industries in part by the higher incidence of persons working 35 hours or less per week (1968: 193). And throughout his book, *The Peripheral Worker*, Morse (1969) alludes to the "peripherality" in the service sector.

These findings imply that despite the shift of employment towards service industries the input of labor has not followed suit to the same extent. Since this consideration has been largely disregarded in most studies dealing with long-term changes in the industry structure of the labor force, this chapter examines the following two aspects: (1) the different work scheduling among industries, and (2) the relationship between employment and input of labor.

Work Scheduling

Morse (1969) has noted that there are many kinds of employment other than full time. In particular, it is important to differentiate between hours worked per week and weeks worked per year.

Usually, reference is made only to hours. To that end, a certain number of hours worked per week (e.g., less than 35) are chosen to distinguish between part-time and full-time work. But full-time workers, i.e., those working at least 35 weekly hours, may not work the entire year. Therefore, one needs to make an additional distinction on the basis of weeks between "continuous" employment (50-52 weeks per year) and, to use Morse's (1969) term, "intermittent" employment (less than 50 weeks). On the basis of these two dimensions, one could argue that only persons who work 35 hours or more hours per week throughout the entire year qualify as full-time employment. Besides this group, then, there exist many other types of employment (see Table III-1 for some combinations of hours and weeks). Table III-1 certainly is not exhaustive, for more subcategories could be formed by differentiating further the number of hours.

For the purposes of the first part of this chapter, however, we will treat separately hours and weeks worked. In the second part these two dimensions of work scheduling will be combined to arrive at the total labor input.

Part-Time vs. Full-Time Employment. The incidence of part-time employment can be viewed from two different perspectives. On the one hand, some people might prefer to work only part of the regular hours because of other commitments such as schooling. This consideration is most likely to account for the high proportion of part-time employment in retail trade, particularly food stores, and eating and drinking places.

It also has been frequently mentioned in the literature that many women prefer part-time work due to other demands (children and household) on their time. In the case of women, however, the voluntary nature of part-time employment is less clear. Given the strong existence of sex stereotyping in the labor force, the explanation of the higher incidence of women working part time may well be an *ex post facto* explanation. Since the decennial census data do not include any questions concerning voluntary and involuntary part-time employment, this aspect cannot properly be addressed here, despite its unquestioned importance. (The only way, at this point, to circumvent the inadequacy of the data would involve estimates from the Current Population Surveys.)

The other viewpoint concerns the scheduling requirements of production. Certain industries are less conducive to part-time employment than others. Production processes that require a high degree of formal organization would be less likely to employ persons on a part-time basis. One example of this is the assembly line. Particularly those industries that require a large amount of capital equipment and which operate on a two or three shift basis are most likely to favor full-time employment, as in petrochemicals. Most manufacturing industries fit this characterization.

Table III-1

TYPES OF PERIPHERALITY

Type	Civilian Labor Force in 1965 (in millions)
Slightly Peripheral	
40-49 weeks, over 35 hours	6.6
Moderately Peripheral	
27-39 weeks, over 35 hours	4.7
50-52 weeks, 35 hours or less	5.4
40-49 weeks, 35 hours or less	1.5
Severely Peripheral	
14-26 weeks, over 35 hours	4.3
27-39 weeks, 35 hours or less	1.8
Extremely Peripheral	
26 weeks or less, 35 hours or less	8.8
13 weeks or less, over 35 hours	4.8
Total	37.9

Adapted from Morse, 1969:43.

In contrast, many services permit a much higher degree of part-time work. The extreme example is domestic service. Most domestic servants are hired on a part-day basis and therefore they need more than one employer to come up with at least a moderate amount of total work. But many other services, although to a lesser extent, do not depend on full time work either. Retailing, for example, can efficiently use part-time help, especially during nights and weekends. The same situation exists for eating and drinking places.

To a large extent, part-time work is related to the absence of an even and continuous level of production. In the case of services, an even level often is difficult to maintain, for they cannot be stored. Thus, if demand is uneven during the course of the day, so is production. Consider the example of eating and drinking places. The demand for these services is much higher between 11:00 am to 2:00 pm and 5:00 pm to 8:00 pm than at any other time. Establishments therefore can be expected to hire additional part-time help during these peak hours of production. These considerations are much less relevant in manufacturing, because their goods can be stored and no direct link exists between production and consumption. On the other hand, there are many services that require a much higher proportion of full-time work. Examples of this include banking and government, both of which are formally organized bureaucracies.

In general, however, it can be expected that services are more flexible in their work schedules and therefore permit a higher degree of part-time work than the Transformative sector. Among services, Personal services and trade (mostly retail trade) are more likely to have part-time employment than Producer and Social services.

The question of flexibility in the schedule of work raises another aspect which as yet has been largely ignored. In addition to part- and full-time employment there are many persons who work more than full time. Although this is found in many Transformative industries, particularly in construction, the greater flexibility of many services make it easier for them to accommodate people who work more than full time. In particular, it is expected that industries with a high degree of self-employment also will have a substantial proportion of persons working more than a standard number of hours; primarily in retailing, personal services, and eating and drinking places. On the basis of the preceding discussion, three employment categories will be examined across industries: (1) persons working less than 30 hours per week, (2) those who work 40 hours, and (3) those working more than 48 hours.

For the first group, Tables III-2 and III-3 show that women are twice as likely to work less than 30 hours per week than are males. This situation exists in all 37 industries, although the differences are less pronounced in some industries than in others.

What is striking in these tables, however, is the fact that for the relative position of industry sectors in terms of part-time work, sex does not make much of a difference. For males as for females, the Personal services sector has the highest share of part-time employment. This is mostly due to domestic service, but all Personal services are characterized by a high proportion of part-time employment. As was expected, part-time employment is very pronounced in agriculture and retail trade. For retail trade, this reflects the fact that many of the young employees are still in school and that the demand for retailing peaks at certain hours.

Table III-2

NUMBER OF HOURS WORKED PER WEEK BY INDUSTRY SECTOR AND INTERMEDIATE INDUSTRIES, 1960-1970: MALES

(in percent)

Sectors and Industries	1-29		30-39		40		41-48		49 and over	
	1960	1970	1960	1970	1960	1970	1960	1970	1960	1970
I. *EXTRACTIVE*	*15.5*	*14.3*	*8.6*	*7.6*	*17.6*	*22.7*	*12.6*	*13.0*	*45.6*	*42.5*
1) Agriculture	16.6	16.6	8.5	8.1	13.5	17.4	11.8	11.0	49.6	47.0
2) Mining	8.5	4.4	9.6	5.0	44.1	46.4	17.7	21.6	20.1	22.6
II. *TRANSFORMATIVE*	*6.4*	*6.0*	*8.1*	*10.2*	*54.8*	*53.4*	*18.8*	*17.7*	*11.9*	*12.7*
3) Construction	11.4	9.8	10.7	12.2	47.2	51.4	18.0	14.8	12.7	11.9
4) Food	5.3	4.8	7.4	9.5	40.6	42.8	24.0	22.5	22.8	20.5
5) Textile	4.8	5.4	11.2	12.0	47.6	45.8	25.0	24.2	11.4	13.6
6) Metal	3.0	3.3	6.3	8.0	66.7	58.9	15.7	18.4	8.4	11.4
7) Machinery	2.4	3.2	4.7	9.9	63.7	57.2	18.2	17.5	11.0	12.2
8) Chemical	2.1	2.4	4.9	8.1	68.3	62.0	16.0	16.3	8.7	11.3
9) Misc. manufacturing	10.0	9.1	11.4	11.3	47.5	47.7	19.5	18.8	11.6	13.1
10) Utilities	3.3	3.2	3.0	5.0	69.2	66.0	16.0	15.3	8.5	10.6
III. *DISTRIBUTIVE SERVICES*	*9.7*	*12.0*	*5.2*	*6.8*	*33.8*	*34.4*	*22.9*	*21.2*	*18.5*	*25.6*
11) Transportation	6.8	7.8	5.3	6.6	49.2	44.7	18.9	18.3	19.8	22.6
12) Communication	2.9	3.4	9.1	8.9	61.3	48.8	17.2	22.0	9.5	17.0
13) Wholesale	5.5	5.6	6.2	7.0	36.3	40.0	27.8	24.4	24.2	23.2
14) Retail	13.2	17.4	4.4	6.7	22.9	26.1	23.7	21.1	35.8	28.8
IV. *PRODUCER SERVICES*	*6.5*	*8.2*	*14.2*	*13.9*	*35.4*	*36.5*	*23.0*	*20.4*	*21.0*	*21.0*
15) Banking	5.6	6.8	20.7	19.2	38.9	40.1	22.1	21.0	12.7	12.8
16) Insurance	4.3	5.1	16.9	18.7	31.6	32.6	24.2	20.9	23.0	22.7
17) Real Estate	10.0	12.8	9.0	9.0	33.5	35.8	22.7	18.4	24.9	24.1
18) Engineering	4.8	6.1	8.2	7.9	44.6	47.5	22.3	20.8	20.1	17.8
19) Accounting	5.0	6.4	12.5	9.2	24.4	25.8	20.2	18.0	38.0	40.6
20) Misc. business	8.9	11.4	11.3	11.7	42.1	40.4	21.3	19.0	16.4	17.6
21) Legal services	4.7	5.9	12.5	11.5	20.9	19.2	30.4	27.5	31.6	35.9
V. *SOCIAL SERVICES*	*8.6*	*11.5*	*7.8*	*9.4*	*46.1*	*47.4*	*17.9*	*15.8*	*20.5*	*18.0*
22) Medical services	7.0	9.6	8.7	11.8	21.9	26.3	21.7	16.9	40.7	35.5
23) Hospitals	6.5	9.7	3.8	6.6	55.1	55.8	17.3	11.6	17.4	16.2
24) Education	15.7	20.0	11.5	13.0	33.3	38.1	21.4	14.2	18.1	14.8
25) Welfare	15.2	14.3	5.6	8.4	17.8	25.8	14.5	12.5	46.9	39.1
26) Nonprofit	17.2	16.6	9.2	11.7	31.7	33.7	19.6	18.1	22.4	19.9
27) Postal services	4.4	7.6	4.7	7.1	61.3	59.3	15.7	14.7	13.9	11.3
28) Government	3.6	4.0	4.7	6.5	60.4	61.0	15.7	12.9	15.7	15.7
29) Misc. social serv.	6.6	9.4	10.6	11.8	44.8	46.7	18.8	14.9	19.2	17.2
VI. *PERSONAL SERVICES*	*15.9*	*22.2*	*6.5*	*8.0*	*25.2*	*26.6*	*22.7*	*18.0*	*29.7*	*25.3*
30) Domestic services	41.9	54.7	9.9	9.2	25.3	21.4	13.0	7.8	9.9	6.9
31) Hotels	12.3	17.9	6.9	7.9	29.9	32.5	24.4	18.0	26.7	23.7
32) Eating & drinking	15.5	31.4	5.9	9.2	22.6	18.7	19.4	13.4	36.5	27.4
33) Repair	10.0	11.6	5.0	6.4	26.7	33.2	27.5	23.7	30.8	25.1
34) Laundry	8.9	11.7	5.8	7.0	29.6	32.3	25.2	20.2	30.5	28.7
35) Barber & beauty	9.3	10.1	5.1	6.1	23.4	26.4	27.3	23.6	35.0	33.8
36) Entertainment	27.1	30.2	9.8	10.0	22.0	26.5	19.0	14.9	22.2	18.4
37) Misc. personal	11.2	13.4	6.2	8.4	23.4	24.9	22.7	20.5	36.5	32.9
TOTAL LABOR FORCE	*9.1*	*10.1*	*7.6*	*9.2*	*41.7*	*42.9*	*19.5*	*17.8*	*22.2*	*20.0*

Table III-3

NUMBER OF HOURS WORKED PER WEEK BY INDUSTRY SECTOR AND INTERMEDIATE INDUSTRIES, 1960-1970: FEMALES

(in percent)

Sectors and Industries	1-29		30-39		40		41-48		49 and over	
	1960	1970	1960	1970	1960	1970	1960	1970	1960	1970
I. EXTRACTIVE	*34.9*	*29.3*	*16.7*	*15.0*	*20.6*	*28.5*	*9.3*	*9.0*	*18.5*	*18.3*
1) Agriculture	37.2	32.7	16.8	14.5	16.8	23.1	9.4	9,2	19.7	20.5
2) Mining	9.9	9.2	15.7	18.2	62.3	59.7	7.6	7.9	4.6	5.0
II. TRANSFORMATIVE	*11.0*	*10.5*	*18.3*	*19.6*	*59.3*	*59.0*	*9.4*	*8.4*	*1.9*	*2.5*
3) Construction	19.7	20.2	17.7	16.1	47.5	52.7	10.4	7.0	4.8	4.0
4) Food	19.0	14.6	19.8	22.3	46.5	49.8	10.9	10.2	3.8	3.1
5) Textile	11.5	11.7	25.5	25.6	51.0	51.8	10.8	9.1	1.3	1.9
6) Metal	7.9	7.9	12.2	15.6	69.9	65.0	8.7	8.8	1.4	2.7
7) Machinery	6.1	6.2	10.6	14.5	73.3	68.8	8.5	8.0	1.6	2.5
8) Chemical	6.4	6.2	17.0	19.8	67.9	66.0	7.0	5.8	1.8	2.2
9) Misc. manufacturing	12.0	12.0	19.3	20.0	58.0	57.2	8.9	8.4	1.9	2.5
10) Utilities	7.4	6.9	9.7	14.6	75.0	70.2	6.7	5.1	1.2	3.2
III. DISTRIBUTIVE SERVICES	*23.4*	*28.6*	*15.2*	*19.2*	*41.4*	*39.6*	*13.6*	*8.0*	*6.5*	*4.7*
11) Transportation	17.5	26.4	13.1	14.0	54.9	46.3	9.8	8.6	4.8	4.8
12) Communication	6.9	8.6	19.4	21.0	63.6	60.8	8.1	7.6	2.0	2.0
13) Wholesale	17.3	15.4	19.5	19.0	48.8	52.4	10.7	9.6	3.8	3.6
14) Retail	27.3	34.0	14.1	19.6	35.7	33.6	15.2	7.7	7.8	5.2
IV. PRODUCER SERVICES	*14.7*	*16.8*	*32.4*	*30.9*	*41.8*	*42.5*	*8.1*	*6.6*	*3.1*	*3.2*
15) Banking	8.1	10.8	33.5	31.6	48.8	49.8	8.2	6.6	1.5	1.2
16) Insurance	11.1	13.0	41.4	41.3	40.8	39.8	5.3	4.5	1.5	1.5
17) Real Estate	24.0	26.4	21.6	20.3	32.0	35.0	11.8	8.8	10.7	9.5
18) Engineering	17.3	16.8	18.5	22.0	55.2	51.9	7.6	5.3	1.5	4.0
19) Accounting	25.2	20.6	21.5	19.6	29.8	35.1	13.8	13.6	9.7	11.1
20) Misc. business serv.	24.9	25.4	24.4	23.6	39.3	40.6	8.4	6.8	3.0	3.6
21) Legal services	16.3	18.4	35.0	36.8	36.2	35.7	9.6	6.2	2.9	3.0
V. SOCIAL SERVICES	*19.7*	*24.0*	*18.4*	*19.0*	*44.8*	*46.7*	*11.5*	*6.8*	*5.8*	*3.5*
22) Medical services	19.2	24.2	14.9	17.0	37.8	44.1	17.6	10.0	10.5	4.8
23) Hospitals	14.7	17.5	7.4	10.2	60.2	62.8	13.4	6.9	4.3	2.7
24) Education	23.9	30.1	27.3	24.7	33.5	35.2	10.2	6.4	5.2	3.6
25) Welfare	33.6	30.6	16.2	21.4	27.1	36.6	11.1	5.9	12.0	5.6
26) Nonprofit	23.6	29.1	28.3	30.3	35.0	30.8	8.7	6.1	4.4	3.8
27) Postal services	32.5	27.4	10.7	13.8	33.0	45.3	17.1	9.6	6.7	3.9
28) Government	10.5	11.0	14.2	15.7	62.7	65.8	8.4	5.0	4.3	2.5
29) Misc. social serv.	28.8	30.2	18.0	20.7	42.4	38.7	6.6	6.4	4.2	4.0
VI. PERSONAL SERVICES	*34.2*	*37.8*	*15.9*	*16.9*	*24.5*	*26.6*	*15.4*	*10.3*	*12.0*	*8.5*
30) Domestic services	46.8	50.4	13.2	14.5	19.9	22.4	10.1	7.8	10.1	6.8
31) Hotels	20.6	25.2	13.0	16.0	27.7	32.3	19.8	13.8	18.9	12.8
32) Eating & drinking	25.7	37.9	13.8	16.9	23.9	23.2	21.0	12.2	15.7	9.9
33) Repair	27.1	25.0	15.0	19.3	39.0	37.8	11.7	8.7	7.2	9.3
34) Laundry	16.5	22.2	15.7	23.8	38.3	38.9	21.3	10.2	8.2	4.9
35) Barber & beauty shop	25.4	29.2	13.6	18.3	30.2	31.7	20.1	12.9	10.7	8.0
36) Entertainment	41.4	45.4	18.0	16.8	23.6	23.3	10.3	8.5	6.7	5.6
37) Misc. personal serv.	37.8	42.1	16.6	14.8	25.3	26.4	9.7	8.9	10.6	7.9
TOTAL LABOR FORCE	*21.2*	*23.5*	*18.0*	*20.0*	*42.6*	*44.2*	*11.8*	*7.9*	*6.3*	*4.4*

Manufacturing industries and utilities show the lowest proportion that works part time. The same situation exists for communication. Even for females, only 8.6% of total employment in communications worked less than 30 hours in 1970. Moreover, among manufacturing the three most modern and capital intensive industries (metal, machinery, and chemical) employed relatively fewer persons on a part-time basis than the remaining manufacturing industries. This supports our earlier statement that industries with a high degree of formal organization and a high capital-labor ratio are less likely to employ part-time workers than are the remaining industries.

The data in Tables III-2 and III-3 show, moreover, that by and large, part-time employment as proportion of total employment increased during the 1960's in most industries, more so for males than for females. But again, service industries were more likely to have higher proportions of part-time employment in 1970 in comparison with 1960 than were manufacturing industries.

Concerning the second group, we noted earlier that industries with a high capital-labor ratio and a high degree of formal organization tend to have more full-time employment than those industries the production of which is less structured and depends less on capital equipment. Using 40 hours per week as a standard for full-time work each day during the week, we can see in Table III-2 that the data are consistent with this postulated relationship. (The assumption made here is that persons who work 40 hours per week are employed throughout the week.) There is no way to confirm this assumption with available census data. It could be that some persons with 40 reported weekly hours work only three or four days, but they are not likely to be a significant share of the total.

For most industries, 40 hours per week is the modal category; this situation characterizes female employment slightly better than male employment. As expected, agriculture, retail trade, and Personal services have the lowest shares of employment working 40 hours per week. In addition, relatively few males work these hours in accounting and bookkeeping,legal services, and medical services. But in these cases of the latter three industries, the low proportion of males working 40 hours per week is due to the fact that more males worked over 48 hours.

The Transformative sector had the largest proportion of employment working 40 hours per week. But, again, it is primarily the capital-intensive industries that have the highest proportion of employment working 40 hours: metal, machinery, chemical, utilities, and communication. Only males in the last industry have become less likely to work 40 hours per week during the 1960's. Two other industries also tend to employ workers for 40 weekly hours: postal services (more for males than for females), and government. Work in both of these industries is highly bureaucratized, and "production" is separated largely from consumption. Moreover, in contrast to retailing establishments, for example, which cater to the demands of the consumer, most governmental agencies fix their own schedules and office hours to which the client has to adjust. Given this more regulated level of "production," the high proportion of employment working 40 hours per week in government is not expected.

Finally, the term full-time work commonly is used to distinguish this group from persons working only a small number of hours per week. But the concentration on the part-time/full-time dichotomy has ignored the fact that in many industries a significant part of the work force are employed for substantially longer hours than the standard 40-hour week. This is important for an understanding of the work situation within services, since their generally greater flexibility in the organization of work might also permit them to employ more persons for a large number of hours per week than other industries. It thus could be hypothesized that among industries, the greater the proportion of employment working part time the higher the proportion of employed persons working more than a standard work week. To examine this relationship, we shall focus on those categories working less than 30 hour per week and more than 48 hours per week.

In 1970 the rank-order correlation coefficients for 37 industries between the percent employed less than 30 hours and the percent employed more than 40 hours are .380 ($p. > .05$) for males and .728 ($p. > .001$) for females. These results show that industries which are characterized by a large share of part-time employment also tend to have a large proportion of workers with more than 48 hours per week. This relationship is stronger for females than for males.

It was noted earlier that self-employed workers in general work more hours than persons who are employed (see Table III-4 for the variation of self-employment by industry). Thus, among industries, the higher the percent self-employed, the higher the percent working more than 48 hours. Again a rank-order correlation for these two variables was performed with the 37 industries, using the 1970 data. The coefficients are .748 ($p. > .001$) for males and .778 ($p. > .001$) for females. The results thus reveal that among industries a strong correlation exists between the percent self-employed and the proportion of employment working more than 48 hours.

These findings suggest that the previous focus on the high incidence of part-time work in services has been somewhat misleading. Although it is true that services are more likely to employ workers on a part-time basis, they also are more likely to employ persons for more than the average number of hours. It thus can be expected that the per capita total number of hours worked is not much lower in services than in goods-producing industries.

Continuous versus Intermittent Employment. In the previous section the focus of the analysis was on the number of hours worked per week in order to evaluate the employment pattern among industries along the part-time/full-time dimension. In this section we are concerned with the stability of employment over time, in this case for one year. The reader needs to be reminded, however, that the term continuous employment refers to his labor force status and not to job tenure. In other words, someone who is employed throughout the year may have changed jobs a number of times. Similarly, those working only one-half of the year are not very likely to be idle the other half; rather, they can be expected to have worked for a number of limited time periods during the entire year. In this sense, the following analysis is somewhat restricted, but the use of census data offers no other choice.

The data in Tables III-5 and III-6 show that for the total labor force, more persons worked during the entire year (50-52 weeks) in 1969 than in 1959. But as was the case with hours, males are much more likely to work 50-52 weeks per year than are females. In 1969, three-fourths of all males were continuously employed throughout the year as compared to only slightly one-half (54.4 percent)

Table III-4

PERCENT SELF-EMPLOYMENT BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRY CATEGORY, AND SEX: 1970

Sectors and Industries	Male	Female
I. *EXTRACTIVE*	*45.27*	*21.01*
1) Agriculture	55.11	24.14
2) Mining	2.77	2.54
II. *TRANSFORMATIVE*	*4.14*	*0.88*
3) Construction	13.79	5.33
4) Food	1.40	0.63
5) Textile	1.50	0.45
6) Metal	0.70	0.21
7) Machinery	0.79	0.17
8) Chemical	0.48	0.44
9) Misc. manufacturing	3.16	1.20
10) Utilities	0.90	0.08
III. *DISTRIBUTIVE SERVICES*	*9.22*	*4.53*
11) Transportation	5.17	1.75
12) Communication	0.33	0.14
13) Wholesale	6.71	2.01
14) Retail	13.00	5.90
IV. *PRODUCER SERVICES*	*15.33*	*3.24*
15) Banking	2.90	0.27
16) Insurance	9.34	1.29
17) Real Estate	19.48	8.94
18) Engineering	13.33	2.40
19) Accounting	33.64	9.18
20) Misc. business serv.	11.78	6.48
21) Legal services	66.96	2.89
V. *SOCIAL SERVICES*	*4.96*	*1.73*
22) Medical services	33.77	4.66
23) Hospitals	1.2[illegible]	.53
24) Education	0.75	1.83
25) Welfare	8.76	1.53
26) Nonprofit	----	----
27) Postal services	----	----
28) Government	----	----
29) Misc. social serv.	24.71	24.20
VI. *PERSONAL SERVICES*	*20.34*	*9.43*
30) Domestic services	2.63	0.99
31) Hotels	9.85	13.61
32) Eating & drinking	14.66	6.33
33) Repair	27.18	12.46
34) Laundry	21.22	4.75
35) Barber & beauty shop	52.98	33.81
36) Entertainment	10.39	7.32
37) Misc. personal serv.	33.42	37.85
TOTAL LABOR FORCE	*10.3*	*3.6*

Table III - 5

WEEKS WORKED PER YEAR BY INDUSTRY SECTORS AND INTERMEDIATE INDUSTRIES, 1960-1970: MALES
(in percent)

Sectors and Industries	1-39		40-49		50-52	
	1960	1970	1960	1970	1960	1970
I. *EXTRACTIVE*	*18.8*	*14.2*	*15.1*	*11.3*	*66.2*	*74.5*
1) Agriculture	18.5	15.5	14.6	10.9	66.9	73.7
2) Mining	20.8	8.9	18.1	13.3	61.1	77.8
II. *TRANSFORMATIVE*	*14.0*	*9.2*	*17.3*	*14.7*	*68.7*	*76.1*
3) Construction	22.2	14.9	26.9	22.9	50.9	62.2
4) Food	9.6	8.8	12.1	11.6	78.4	79.7
5) Textile	12.2	9.8	16.0	13.2	71.8	77.0
6) Metal	21.3	7.0	16.0	13.2	62.7	79.8
7) Machinery	9.6	6.4	16.0	13.2	74.4	80.4
8) Chemical	5.7	5.1	8.7	9.6	85.7	85.4
9) Misc. manufacturing	13.0	9.9	16.4	12.7	70.7	77.5
10) Utilities	6.2	5.8	7.8	8.9	86.1	85.4
III. *DISTRIBUTIVE SERVICES*	*13.0*	*12.7*	*12.4*	*12.0*	*74.6*	*75.4*
11) Transportation	11.9	8.9	16.7	15.4	71.4	75.7
12) Communication	4.6	7.0	5.3	8.1	90.2	84.9
13) Wholesale	9.2	7.7	10.6	10.0	80.2	82.3
14) Retail	15.7	17.1	11.4	11.6	72.9	71.3
IV. *PRODUCER SERVICES*	*9.5*	*9.3*	*10.4*	*10.7*	*80.2*	*80.0*
15) Banking	7.9	8.1	8.5	9.0	83.7	82.9
16) Insurance	6.3	5.5	8.3	8.7	85.3	85.8
17) Real Estate	12.4	10.9	12.6	13.2	75.0	75.9
18) Engineering	11.7	9.6	10.5	8.8	77.9	81.6
19) Accounting	9.3	11.3	9.3	8.8	81.5	80.0
20) Misc. business serv.	13.4	13.4	12.9	13.2	73.6	73.4
21) Legal services	5.1	5.1	11.2	11.3	83.7	83.6
V. *SOCIAL SERVICES*	*11.5*	*12.2*	*13.0*	*14.6*	*75.5*	*75.3*
22) Medical services	6.2	7.9	20.6	21.1	73.3	71.1
23) Hospitals	13.6	13.3	11.2	12.3	75.1	74.5
24) Education	20.7	21.1	23.9	24.1	55.5	54.8
25) Welfare	12.4	11.4	9.0	9.1	78.6	79.5
26) Nonprofit	16.3	16.9	10.9	12.4	72.9	70.8
27) Postal services	5.7	4.3	7.5	9.3	86.9	86.4
28) Government	6.5	5.4	6.7	6.8	86.9	87.8
29) Misc. social serv.	10.3	11.1	12.6	11.4	77.2	77.6
VI. *PERSONAL SERVICES*	*20.4*	*22.0*	*14.6*	*14.3*	*65.0*	*63.7*
30) Domestic services	41.1	47.0	14.8	13.5	44.2	39.5
31) Hotels	22.0	21.8	15.6	16.8	62.5	61.4
32) Eating & drinking	21.1	30.7	14.7	15.2	64.2	54.2
33) Repair	15.2	13.7	14.0	13.5	70.7	72.8
34) Laundry	13.2	11.2	11.5	10.2	75.4	78.5
35) Barber & beauty shop	12.0	9.3	17.8	14.3	70.2	76.4
36) Entertainment	29.6	27.6	15.1	16.0	55.3	56.4
37) Misc. personal serv.	13.2	13.3	13.5	10.8	73.4	76.0
TOTAL LABOR FORCE	*14.2*	*11.7*	*14.8*	*13.5*	*71.0*	*74.8*

Table III-6

WEEKS WORKED PER YEAR BY INDUSTRY SECTOR AND INTERMEDIATE INDUSTRIES, 1960-1970: FEMALES
(in percent)

Sectors and Industries	1-39		40-49		50-52	
	1960	1970	1960	1970	1960	1970
I. EXTRACTIVE	34.4	30.6	12.5	11.7	53.1	57.6
1) Agriculture	35.8	33.2	12.7	11.9	51.5	54.9
2) Mining	18.9	16.2	10.4	11.0	70.1	72.9
II. TRANSFORMATIVE	23.9	19.6	19.1	17.9	57.0	62.5
3) Construction	26.6	18.4	13.1	14.6	60.3	67.1
4) Food	29.6	25.3	16.8	18.0	53.7	56.7
5) Textile	26.3	21.5	26.5	22.4	47.2	56.1
6) Metal	22.1	17.3	15.4	16.1	62.5	66.6
7) Machinery	21.4	17.4	17.2	17.1	61.4	65.5
8) Chemical	17.4	16.8	11.4	13.7	71.2	69.5
9) Misc. manufacturing	23.4	20.4	18.3	17.0	58.3	62.7
10) Utilities	13.3	11.5	7.7	8.0	79.0	80.5
III. DISTRIBUTIVE SERVICES	28.7	27.8	13.9	15.1	57.4	57.1
11) Transportation	23.0	25.3	14.5	15.8	62.6	59.9
12) Communication	16.9	19.8	11.4	13.6	71.8	66.6
13) Wholesale	25.2	21.9	12.5	14.9	62.3	63.2
14) Retail	31.5	30.4	14.5	15.2	54.0	54.3
IV. PRODUCER SERVICES	23.5	22.5	11.5	13.4	65.1	64.1
15) Banking	21.1	19.0	10.2	12.8	68.8	68.2
16) Insurance	21.0	20.4	9.8	11.9	69.2	67.7
17) Real Estate	22.8	22.6	13.8	15.3	63.4	62.2
18) Engineering	23.1	21.5	12.2	13.6	64.8	65.0
19) Accounting	28.8	29.7	14.4	12.8	56.9	57.5
20) Misc. business serv.	33.2	31.0	14.1	15.2	52.7	53.3
21) Legal services	21.1	18.4	13.5	14.0	65.4	67.4
V. SOCIAL SERVICES	33.8	31.8	19.1	20.1	47.1	48.2
22) Medical services	27.1	25.5	16.1	16.4	56.8	58.1
23) Hospitals	25.4	22.1	15.4	15.6	59.2	62.3
24) Education	47.8	44.3	26.9	27.5	25.3	28.2
25) Welfare	25.6	22.5	15.2	13.8	59.2	63.7
26) Nonprofit	26.5	27.3	12.1	15.2	61.4	57.6
27) Postal services	24.4	18.6	10.2	14.0	65.5	67.5
28) Government	19.2	17.7	9.1	10.3	71.8	72.0
29) Misc. social serv.	26.3	29.3	17.0	14.8	56.7	55.9
VI. PERSONAL SERVICES	37.9	35.6	17.3	17.9	44.8	46.4
30) Domestic services	43.5	39.4	17.1	18.6	39.4	42.0
31) Hotels	30.5	32.5	15.4	17.1	54.1	50.5
32) Eating & drinking	38.1	40.4	18.1	17.4	43.8	42.2
33) Repair	28.0	23.4	14.7	14.6	57.3	62.0
34) Laundry	26.6	24.4	15.9	17.0	57.5	58.7
35) Barber & beauty shop	28.6	25.3	21.0	20.3	50.4	54.4
36) Entertainment	42.0	39.4	15.9	17.4	42.1	43.2
37) Misc. personal serv.	35.4	32.4	17.8	18.4	46.8	49.3
TOTAL LABOR FORCE	30.4	28.0	16.9	17.6	52.8	54.4

of all females. Moreover, among females not working the entire year, the majority works under 40 weeks, whereas among males with less than 50-52 weeks, most work 40-49 hours.

Some of the inter-industry differences in the stability of employment are noteworthy (although the data for males show a remarkable similarity among industries). Tables III-5 and III-6 reveal, for example, that agriculture, in contrast to its high proportion of part-time employment, has a high share of employment working throughout the entire year. For both males and females, education, domestic service, eating and drinking places, and entertainment are characterized by a substantially lower proportion of employment with 50-52 weeks. We already have alluded to domestic service and eating and drinking places. The erratic nature of entertainment employment is obvious and the summer vacation schedules and substitute teachers in education account for the situation in that industry.

For Personal services, the high share of intermittent employment is due more to persons having either one job for a relative short time period or having several jobs during the year with significant amounts of unemployment between these jobs. It is interesting to note in this context that in all but one Personal service, relative more males worked less than 40 weeks in 1969 than they worked 40-49 weeks. The high prevalence of intermittent employment in Personal services is not very surprising, since these services include mostly low-skilled and low-wage occupations. Most positions in Personal services do not lead to a career, nor do they offer job security through seniority. Thus, many of the positions in Personal services are temporary and, moreover, they do not offer many incentives for the job holders to stay in them.

Finally, construction perhaps fits the example of a seasonal industry best, but it applies only to males, for female employment in construction usually is concentrated in clerical occupations, which are not exposed to the same conditions as on-site construction work. But the figures in Table III-5 show that construction increasingly becomes continuous employment. Similarly, in 1959, only one-half of employment in agriculture was at work for 50-52 weeks, but in 1969 this proportion had increased to 62.2 percent. As Morse (1969: 82) described this change:

> To the extent that in the past a large part of construction activity had to take place at the site itself and could not be carried on in unseasonable weather, the construction industry was also in the grip of the seasons. One of the major shifts in this industry has taken the form of the development of techniques which make it possible to employ a good part of the labor inputs which ultimately will go into the finished structure in offsite locations protected against inclement weather.

Thus, with more implementation of new technologies, construction work will more resemble work in other industries in terms of its work schedule throughout the year, although it is not likely to completely overcome the vagaries of weather and scheduling.

This part of the chapter has examined the nature of work scheduling in terms of two dimensions: full time vs. part time and continuous vs. intermittent employment. The first dimension was discussed by focusing on the number of hours worked per week, whereas the other dimension concerns the scheduling of work during the year in terms of weeks. Although some industries, such as domestic service, are characterized by equally high proportions of part time and intermittent work, this is not the case for many industries. Therefore, the two dimensions should be treated as analytically distinct ones, since the requirements for the scheduling of work during the day are not necessarily the same as those for the entire year.

Employment and the Input of Labor

The discussion in Chapter II demonstrated how the various service industries, in particular Social and Producer services, steadily increased their share of the total labor force during the past one hundred years. We noted before, however, that the sectoral transformation of the labor force towards service industries does not necessarily imply an equal shift of labor input towards services. If workers in services work substantially shorter hours and weeks than in goods-producing industries, for example, the distribution of total labor input among industries would be quite different from that of employment. Although the shifts of employment in themselves are significant, the growth of services becomes even more important if it includes actual labor as well. The following section thus examines the relationship between employment and labor input.

To address this relationship, data for the total number of hours per year were computed for each of the 37 industries. This was done by multiplying the number of hours per week with the number of weeks worked per year for each employed person in a given industry. (Since we are not dealing here with the scheduling of work, but rather with the total input of labor, the two dimensions can be linked in this case.)

Two methodological shortcomings must be mentioned, however. One concerns the assumption that the number of hours worked in a given week is the same for all weeks worked. This is not very likely to be the case, although it should hold better for industries in which the employment is fairly regulated. The other handicap is that the data for weeks are given for the years preceding the 1960 and 1970 censuses, 1959 and 1969 respectively. Thus, the number of weeks reported for 1969, for example, could have been for an industry other than the one reported in 1970. This is an inherent problem quite common with census data, and it will be encountered again in the discussion of earnings. It is not believed, however, that the two assumptions made here will involve a systematic bias, and the data therefore should be considered as fair approximations of the actual situation.

In Table III-7 we present the number of yearly hours per worker in 1969 for each of the 37 industries. These data show that on the average a person in the Extractive sector works the most hours, whereas the Personal service sector accounts for the smallest number of hours per worker. Workers in the Transformative sector are employed for the second largest number of yearly hours, followed by Distributive, Producer, and Social services.

Table III - 7

MEAN NUMBER OF TOTAL YEARLY HOURS PER WORKER BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRIES, AND SEX: 1970

Sectors and Industries	MALES		FEMALES		TOTAL	
	Means	Rank	Means	Rank	Means	Rank
I. *EXTRACTIVE*	*2173*	*1*	*1586*	*3*	*2117*	*1*
1) Agriculture	2184	3	1548	24	2121	1
2) Mining	2124	9	1796	2	2098	2
II. *TRANSFORMATIVE*	*1984*	*4*	*1696*	*1*	*1917*	*2*
3) Construction	1872	32	1631	15	1858	19
4) Food	2091	13	1609	17	1967	13
5) Textile	2002	24	1649	10	1780	23
6) Metal	2026	21	1758	5	1989	8
7) Machinery	2031	20	1761	4	1972	12
8) Chemical	2060	16	1764	3	1998	6
9) Misc. manufacturing	1950	29	1678	9	1873	18
10) Utilities	2050	18	1838	1	2022	3
III. *DISTRIBUTIVE SERVICES*	*2044*	*3*	*1486*	*4*	*1859*	*3*
11) Transportation	2079	15	1574	21	2008	5
12) Communication	2093	11	1716	7	1913	16
13) Wholesale	2129	8	1647	11	2019	4
14) Retail	1988	26	1414	32	1755	27
IV. *PRODUCER SERVICES*	*2048*	*2*	*1607*	*2*	*1851*	*4*
15) Banking	1995	25	1679	8	1817	21
16) Insurance	2129	7	1631	14	1887	17
17) Real Estate	2014	23	1589	19	1855	20
18) Engineering	2052	17	1642	12	1987	9
19) Accounting	2246	2	1601	18	1993	7
20) Misc. business serv.	1942	30	1453	29	1750	28
21) Legal services	2259	1	1623	16	1965	14
V. *SOCIAL SERVICES*	*1958*	*5*	*1479*	*5*	*1692*	*5*
22) Medical services	2184	4	1541	26	1739	29
23) Hospitals	1952	28	1640	13	1713	31
24) Education	1733	34	1299	35	1464	36
25) Welfare	2154	5	1484	28	1804	22
26) Nonprofit	1895	31	1452	30	1692	33
27) Postal services	2018	22	1550	23	1926	15
28) Government	2092	12	1734	6	1978	11
29) Misc. social serv.	1983	27	1424	31	1773	25
VI. *PERSONAL SERVICES*	*1851*	*6*	*1343*	*6*	*1570*	*6*
30) Domestic services	1066	37	1132	37	1125	37
31) Hotels	1869	33	1547	25	1684	32
32) Eating & drinking	1712	35	1338	33	1494	34
33) Repair	2032	19	1575	20	1980	10
34) Laundry	2089	14	1566	22	1776	24
35) Barber & beauty shop	2142	6	1514	27	1723	30
36) Entertainment	1631	36	1212	36	1487	35
37) Misc. personal serv.	2105	10	1313	34	1772	26
TOTAL LABOR FORCE	*2002*		*1521*		*1825*	

But, again, the situation changes when we differentiate the labor force by sex. For the total labor force, the average woman works about three-fourths as many hours per year as the average man (1521 and 2002 hours per year, respectively). Another difference occurs in the relative positions of industry sectors between males and females. For males, the Extractive sector accounts for the highest number of yearly hours per worker, whereas females work the most hours in the Transformative sector. Both males and females work the second most hours in the Producer services sector, while Personal service account for the least number of hours per worker.

It can be noted from the data in Table III-7 that the differences between sectors are much smaller among males and among females than for the total labor force. For example, there is a difference of 447 yearly hours per worker between the highest and the lowest sectors, Extractive and Personal services, respectively. In contrast, the difference between the two extremes is only 322 hours for males and 353 hours for females. This situation is the result of the different industry structure of male and female employment and the fact that females work fewer hours than males. Since women are more concentrated in Producer, Social, and Personal services, their fewer yearly hours mean that the average number of yearly hours per worker is lower in these three sectors when compared to the others.

Although this discussion implies that the growth of service employment has been faster than the growth of service labor input, the difference does not appear to be very large. To assess the magnitude of this difference more exactly, the percentages of the total number of hours worked during 1969 were computed for the six industry sectors and for each of the 37 industries. These data (Table III-8) reveal that among industries the difference between the percent of total employment and the percent of total labor is minimal indeed. For the total labor force, Social and Personal services account for smaller proportions of total employment than of total labor, while the share of total labor exceeds that of total employment the most in the Transformative sector. A very similar situation exists for males and for females, although the differences between employment and labor among industries are more pronounced for females.

The most striking difference between males and females in terms of employment and labor involves the Transformative sector. For males, this sector accounts for a higher share of total employment than of total labor, whereas this difference is reversed for females. The proportion of total labor in the Transformative sector exceeds that of total female employment in this sector by two to six percentage points. This finding is significant for it suggests that the relatively higher proportion of part-time and intermittent work of females as compared with males is mostly concentrated in Social and Personal services. This result thus serves as further support of the assertion made earlier in this chapter that the process of production in Transformative industries is not very conducive to part-time and intermittent work.

The data for the 37 industries by and large show the same pattern as the sectors. Two industries stick out, however: education and domestic service. In both of these industries the share of total employment much exceeds the share of total labor. These two industries therefore are mainly responsible for the fact that the Social and Personal service sectors account for relatively more

Table III - 8

PERCENTAGE DISTRIBUTIONS OF TOTAL YEAR-HOURS AND OF TOTAL EMPLOYMENT, BY INDUSTRY SECTORS, INTERMEDIATE INDUSTRIES AND SEX: 1970

Sectors and Industries	Males			Females			Total		
	Employment	Hours	Difference	Employment	Hours	Difference	Employment	Hours	Difference
I. *EXTRACTIVE*	*6.5*	*7.1*	*.6*	*1.2*	*1.2*	---	*4.5*	*5.3*	*.8*
1) Agriculture	5.3	5.8	.5	1.0	1.0	--	3.7	4.3	.8
2) Mining	1.2	1.3	.1	.2	.2	--	.8	1.0	.2
II. *TRANSFORMATIVE*	*40.5*	*40.2*	*-.3*	*20.9*	*23.5*	*2.6*	*33.1*	*35.1*	*2.0*
3) Construction	8.7	8.1	-.6	.9	1.0	.1	5.8	5.9	.1
4) Food	2.4	2.5	.1	1.4	1.5	.1	2.0	2.2	.2
5) Textile	1.7	1.8	.1	5.1	5.6	.5	3.0	2.9	.1
6) Metal	4.5	4.6	.1	1.2	1.4	.2	3.3	3.6	.3
7) Machinery	10.4	10.5	.1	5.0	5.8	.8	8.3	9.1	.8
8) Chemical	1.9	2.1	.2	.9	1.1	.2	1.6	1.8	.2
9) Misc. manufacturing	8.8	8.6	-.2	5.9	6.5	.6	7.7	8.0	.3
10) Utilities	1.9	2.0	.1	.5	.6	.1	1.4	1.6	.2
III. *DISTRIBUTIVE SERVICES*	*23.6*	*24.1*	*.5*	*20.1*	*19.7*	*-.4*	*22.3*	*22.7*	*.4*
11) Transportation	5.3	5.5	.2	1.5	1.6	.1	3.9	4.2	.3
12) Communication	1.2	1.3	.1	2.0	2.2	.2	1.5	1.5	--
13) Wholesale	5.0	5.4	.4	2.6	2.8	.2	4.1	4.6	.5
14) Retail	12.0	11.8	-.2	14.1	13.1	-1.0	12.8	12.2	-.6
IV. *PRODUCER SERVICES*	*7.2*	*7.3*	*.1*	*9.9*	*10.6*	*.7*	*8.2*	*8.3*	*.1*
15) Banking	1.5	1.5	--	3.2	3.7	.5	2.6	2.1	-.5
16) Insurance	1.5	1.6	.1	2.4	2.6	.2	1.8	1.9	.1
17) Real Estate	1.0	1.0	--	1.1	1.1	--	1.0	1.0	--
18) Engineering	.6	.6	--	.2	.2	--	.4	.4	--
19) Accounting	.4	.4	--	.4	.4	--	.4	.4	--
20) Misc. business serv.	1.7	1.6	-.1	1.9	1.8	.1	1.8	1.7	-.1
21) Legal services	.5	.5	--	.4	.7	.3	.5	.6	.1
V. *SOCIAL SERVICES*	*15.2*	*14.9*	*-.3*	*32.9*	*31.9*	*-1.0*	*21.9*	*20.1*	*-1.8*
22) Medical services	1.0	1.1	.1	4.0	4.0	--	2.2	2.0	-.2
23) Hospitals	1.3	1.3	--	7.6	8.2	.6	3.7	3.4	-.3
24) Education	5.1	4.3	-.8	14.3	12.0	-2.3	8.6	6.7	-1.9
25) Welfare	.9	1.0	.1	1.7	1.7	--	1.2	1.1	-.1
26) Nonprofit	.4	.3	.1	.5	.5	--	.4	.4	--
27) Postal services	1.3	1.2	-.1	.5	.5	--	1.0	1.0	--
28) Government	5.0	5.2	.2	4.0	4.6	.6	4.6	5.0	.4
29) Misc. social serv.	.3	.2	-.1	.3	.2	-.1	.3	.2	-.1
VI. *PERSONAL SERVICES*	*7.0*	*6.3*	*-.7*	*15.0*	*12.8*	*-2.2*	*10.0*	*8.3*	*-1.7*
30) Domestic services	.3	.1	-.2	4.0	2.8	-1.2	1.7	1.0	-.7
31) Hotels	.6	.5	-.1	1.5	1.4	-.1	1.0	1.0	--
32) Eating & drinking	2.1	1.8	-.3	5.2	4.3	-.9	3.3	2.6	-.7
33) Repair	1.8	1.8	--	.4	.4	--	1.3	1.4	.1
34) Laundry	.5	.4	-.1	1.2	1.2	--	.8	.7	-.1
35) Barber & beauty shop	.5	.5	--	1.6	1.6	--	.9	.8	-.1
36) Entertainment	.9	.6	-.3	.8	.6	-.2	.8	.6	-.2
37) Misc. personal serv.	.3	.2	-.1	.3	.2	-.1	.3	.2	-.1
TOTAL LABOR FORCE	*100.0*	*99.9*		*100.0*	*99.7*		*100.0*	*99.8*	

employment than labor. Aside from these two industries, however, the differences between employment and labor are negligible. In sum, the results demonstrate that the sectoral transformation of the labor force moving towards a concentration of employment in service industries has been accompanied by an equally impressive concentration of labor input in services.

PART II: INTER-INDUSTRY MOVEMENT OF EMPLOYMENT

Up to this point the analysis has been concerned with the changes in the industry structure of employment between 1960 and 1970. We have been able to show in Chapter II that the labor force in the United States increasingly has become concentrated in service industries. Not all service industries have expanded, however, and it is the growth of Social and Producer services in particular that is noteworthy. But the analysis did not show how this shift of employment--i.e., the sectoral transformation of the labor force--has occurred. Was the expansion of services due mostly to people moving from Extractive and Transformative industries into the various service industries, or did services grow largely because of new labor force entries? This is an important consideration, for it can shed light on the transferability of employment from one industry to another. If the employment in a given industry decreases, for example, what possibilities exist for people employed in that industry to move elsewhere? And where do they move? It is this set of questions that can now be addressed. (It must be kept in mind that this section does not deal with the reasons for the sectoral transformation of the labor force, but rather with the mechanism by which it occurs.)

Before entering the analysis, however, a few limitations must be discussed. Since this study concentrates on the sectoral transformation of the labor force between 1960 and 1970, the changes of employment from one industry to another should be examined for the same period. Unfortunately, the census questionnaire only permits an analysis for the 1965-70 period. As we noted in the preceding chapter, the 1960's were not an unusual decade in the sense that its labor force changes are the result of conditions and events specific to that period. The same is true of the 1965-70 period. We therefore believe that the inter-industry shifts of employment between 1965 and 1970 are representative of any five-year period during the past twenty years.

In the 1970 Census, a question was asked concerning the industry a person worked in back in 1965. It is the information from this question which forms the basis for the present analysis. It is important to note that the question concerning the 1965 industry was asked of all persons in the particular sample of the census, regardless of their work status in 1970. The sample thus includes people who were not in the labor force in 1970 but who did work in 1965, as well as those who were not in the labor force in 1965 but who were employed in 1970.

The second major limitation of this part of the analysis concerns the fact that we are dealing here exclusively with industries. In order to assess the meaning of the transfer of employment from one industry to the next, however, we would also want to know the kind of work--occupational structure--within a given industry. It is quite clear that different occupations have different degrees of transferability. Lawyers, for example, can be employed in a large variety of different industries, whereas certain specialists, e.g., an aerospace engineer, cannot readily transfer their skills to other industries. On the other hand, this analysis of inter-industry shifts of employment is, to our knowledge, the first attempt to understand on the national level the changes of the labor force from one industry to another. It therefore must be regarded as largely preliminary; once we know more about how industries are related to each other in terms of exchange of employment, additional variables that are important, such as occupation and class of worker, need to be introduced.

Of particular interest is the examination of the three industry sectors whose share of employment decreased between 1960 and 1970: Extractive, Transformative, and Personal services. Three possibilities can be identified to account for the proportionate decline of employment in these sectors: (1) a shift of employment to the other industry sectors; (2) the exit of persons employed in these sectors from the labor force as such; and (3) a disproportionately small number of new labor force entries employed in the three sectors, such as to reduce the proportionate share.

To analyze these different possibilities, it should be noted at the outset that different population groups vary substantially in their labor force behavior. The most important difference in this respect is that between males and females, both in terms of their distributions among industries, and their patterns of labor force entry and exit. For these reasons, separate analyses will be carried out for males and females. Moreover, inter-industry movements of employment are likely to differ by age. A large proportion of persons over sixty years of age can be expected to leave the labor force, whereas this is less likely for persons under 30. Middle age workers should be expected to exhibit the highest propensity to remain in a given sector, as persons usually reach the zenith of their work careers between the ages of 35 to 45. Since the age structure of employment differs from one industry to another, the analysis in this section will be controlled for age, using the following age categories: under 30 years of age, 30 to 45, and over 45.

Because of the differentiation by sex and age, the sample size does not permit an examination of detailed industries. Many industries have a relatively small employment size to begin with, and once separate age groups, differentiated by sex, are distinguished, the frequencies become too small to permit a meaningful analysis. This problem is made more severe because we have to rely on the 1/1000 sample for this part of the analysis, in contrast to the use of the 1/100 sample tapes for the rest of the study. But even with the larger sample, it is doubtful that the analysis of inter-industry shifts of employment could have been carried out on the level of the 37 detailed industries. Therefore, the results will be presented for the six industry sectors.

Male labor force. The data in Table III-9 show that 60 to 80 percent of employment in a given sector in 1965 remained in that sector in 1970. Of the three sectors whose share of employment declined from 1960 to 1970, Extractive and Personal services show the least continuity of employment during the 1965-70 period. On the other hand, Social services and Transformative are characterized by the highest degree of employment stability: in the Social services four of

Table III - 9

PERCENT OF MALES EMPLOYED IN 1965 WHO REMAINED IN THE SAME INDUSTRY SECTOR IN 1970, BY AGE CATEGORIES OF 1970

Industry Sector	Under 30	30-45	Over 45	Total
Extractive	46.0	70.8	65.4	64.0
Transformative	68.2	83.8	75.9	76.2
Distributive Services	51.2	79.1	75.2	71.1
Producer Services	60.4	77.3	75.8	72.9
Social Services	52.8	85.2	80.0	79.2
Personal Services	36.2	67.6	66.7	60.4

every five males employed remained in that sector, as did three of every four males in the Transformative sector.

When a control is provided for age, however, the situation changes somewhat. Among males under 30 years of age, the Transformative sector reveals much the highest degree of continuity in its employment over the 1965-70 period. This shows that, regardless of age, once males enter the Transformative sector they are unlikely to leave it (at least in this five-year period). On the other hand, only slightly more than one-half of males under 30 years of age who worked in Social services in 1965 remained there until 1970. This proportion is substantially smaller than the degree of continuity for total male employment in the Social services sector. This is due largely to the low degree of continuity of employment in hospitals, welfare and religious services, and miscellaneous professional services. As males in medical services and education are much more likely to remain in a Social service industry, it is likely that these males who are leaving the Social services sector have occupations other than professional ones, since both education and medical services employ a large number of professionals. Any definite statements about this relationship, however, must await the inclusion of occupational data in a later analysis.

The low degree of employment continuity in the Extractive and Personal services sectors that was noted for total employment in these two sectors also exists for all three age groups when compared to the remaining industry sectors.

Regardless of the industry sector, the following pattern of stability of employment by age emerges: males between 30 and 45 years of age are the most stable, ranging from a low of 67.6 to a high of 85.2 percent. This finding thus is consistent with the expectation that males in the mid-range of their careers are most likely to remain in the same type of work. The second most stable figures are accounted for by males over 45 years. Males under 30 years were least likely to have continued in the same industry sector in 1970 in which they had been employed in 1965, but the range for this age category is quite broad, from a low of 36.2 percent in Personal services to a high of 68.2 percent in Transformative.

The foregoing discussion demonstrates that at least 60 percent of total employment in a given industry sector can be expected to remain there over a five-year period, although this proportion differs significantly by age group. On the other hand, a sizeable proportion of employment does leave each particular industry sector within that same relatively short time period. Where do these people go? To answer that question, we shall divide the group of males leaving their respective industry sector into two sub-groups: (1) those moving to a different industry sector, and (2) those leaving the labor force entirely. Since the age groups of 45 years and over includes many males near retirement age, this age group must be expected to have a larger proportion of people leaving the labor force than entering a different industry sector. Among the age groups of less than 30 years, most males leaving their industry sector can be expected to move to another sector. With respect to the age group in the middle, the proportion of persons moving to a different sector also should be higher than that leaving the labor force, but the difference should be smaller in comparison to the youngest age group.

The data in Table III-10 basically support these expectations. In all industry sectors, a larger proportion of males over 45 years left the labor force

Table III - 10

PERCENT OF MALES EMPLOYED IN 1965 WHO CHANGED SECTORS OR LEFT THE LABOR FORCE BETWEEN 1965 AND 1970, BY AGE CATEGORIES OF 1970

1965 Industry Sector	Changing Sectors 1965-1970			Leaving Labor Force 1965-1970		
	Under 30	30-45	Over 45	Under 30	30-45	Over 45
Extractive	35.8	23.3	13.0	18.2	5.9	21.9
Transformative	20.4	12.1	7.1	11.4	4.1	17.1
Distributive Services	33.5	17.1	9.2	15.3	3.8	15.6
Producer Services	32.2	20.1	11.0	7.3	2.6	12.8
Social Services	33.8	11.8	7.0	13.4	3.0	13.0
Personal Services	44.4	25.3	15.5	19.3	7.1	17.8

than moved to a different sector. For the other two age groups the reverse pattern held, as was expected. Some features of Table III-10, however, deserve special attention. For one thing, the proportions of males leaving the labor force do not differ all that much between the youngest and the oldest age groups, although it could have been expected that the older age group would have much higher labor force exits. Indeed, younger males left the labor force from Social and Personal services in larger numbers than older males. The only sectors where older males left the labor force in appreciably larger proportions than younger males are the Extractive, Transformative, and Producer services sectors.

Although the available census data do not offer much help in explaining this situation, one might want to speculate about possible reasons for the high proportion of young males leaving the labor force. Perhaps the most important reason is their decision to go back to school. Particularly in the case of industries in which the job structure does not offer many career possibilities, such as in retailing or in eating and drinking places, young males could be expected to obtain additional education in order to find better positions. Military services is another reason, since members of the armed forces are excluded from our sample.

Concerning the oldest age category, 45 and over, it does not appear that the reason for their leaving is not due to age alone. The two industry sectors with the highest proportion of males over 45 who left the labor force, the Extractive and Personal services sectors, also have the highest proportions of males over 65 that continue to be employed (see U.S. Bureau of the Census, 1973:Table 237). Similarly, we did not find that self-employment is related to the proportion of older males leaving the labor force. Other variables that might be considered in this context include unionization, new technologies, and the demand for labor in certain industries. Whatever the reasons may be, it is important to note that the proportion of males under 30 years of age who left the labor force between 1965 and 1970 comes close to that of the oldest age group and is up to four times the figure for males aged 30-45 who left the labor force during that same time period.

The data in Table III-10 show further that in all six industry sectors males under 30 years of age have the highest proportions of inter-sector changes, followed by males aged 30-45. By the time a male worker reaches the age of 45 and over, he is more likely to leave the labor force entirely rather than move to a different sector.

One of the most interesting findings is the extremely high proportion of males under the age of 30 who left the Personal services sector: more males left than remained in these industries. This indicates that Personal services are viewed by many young males as only a temporary work setting. Although the share of inter-sector shifts of employment for the Personal services sector is lower in the other two age groups, this sector nevertheless accounts for the highest proportions relative to the other industry sectors in all three age groups. The second largest shares are accounted for by the Extractive sector. It thus can be seen that the two sectors which were identified in Table III-9 as having the lowest proportions of employment remaining in the same sector also account for the highest proportions of employment moving to a different sector as well as leaving the labor force entirely.

The final question to be addressed in this part is, Where did the men go who changed industry sectors between 1965 and 1970? The answer is given in Table III-11. Of all sectors, Transformative industries received the majority of employment that came from other industry sectors. This pattern is particularly strong for males under 30 years of age, but it is also prevalent among males aged 30-45. Among the oldest of the three age groups, however, some other sectors received larger shares of employment than the Transformative sector. Six percent of total employment in Personal services in 1965, for example, went to the Distributive sector by 1970, compared to only 3.4 percent for the Transformative sector.

The second largest proportions of employment leaving other industry sectors are accounted for by the Distributive services sector. The flow of employment to the remaining sectors is relatively small, with only few exceptions. It is particularly noteworthy that very few males moved into either the Extractive or the Personal services sector. Obviously, these sectors are not very attractive to persons already employed and therefore depend for their employment almost exclusively on new labor force entries.

In Table III-12 the total share of employment that left each industry sector is proportionately divided among the receiving sectors. For example, 57.7 percent of all males who left the Extractive sector between 1965 and 1970 went to the Transformative sector. These data show that for all three age groups males who left the Extractive and Distributive services sectors were much more likely to go into Transformative industries than were males from the remaining service sectors. Moreover, males who left the Transformative sector entered Distributive services to a greater extent than males from other industry sectors (except in the case of the oldest age group in which the share was the second largest).

The data in Tables III-11 and III-12 do not suggest that the sectoral transformation of the labor force has been the result of persons having left other industry sectors for employment in Social and Producer services. It seems likely, therefore, that the growth of employment in these two industry sectors is mainly due to persons not previously in the labor force who enter these particular services in disproportionately large numbers.

Female labor force. Women in the labor force are much less likely to continue work in the same industry sector over a five-year period than are men (see Table III-13). The proportion of total female employment remaining in the same industry sector from 1965 to 1970 ranges from about two-fifths to two-thirds, compared with a range of about three-fifths to four-fifths for males. Despite the fact that women have lower levels of employment continuity in all industry sectors, the differences among the sectors in terms of employment continuity are very similar for males and females. As in the case of males, for example, females are most likely to continue work in the same industry sector in the Social services and Transformative sectors, with the Extractive and Personal services sectors being characterized by the lowest degree of employment stability. Among the six industry sectors, continuity of female employment appears to be positively associated with the 1960-1970 increase in employment as a proportion of the total female labor force.

Table III - 11

INTER-INDUSTRY EMPLOYMENT SHIFTS OF MALES BETWEEN 1965 AND 1970, BY AGE

(Percentages based on 1965 labor force)

1965 Industry Sector	1970 Industry Sector						Intra-Sector Shift
	I	II	III	IV	V	VI	
Under 30 yrs. of age							
I. Extractive	—	20.3	8.3	1.0	3.2	3.0	0.5
II. Transformative	1.5	—	10.5	2.6	3.4	2.4	16.7
III. Distributive Services	1.2	19.3	—	4.5	5.9	2.6	6.5
IV. Producer Services	0.0	13.4	10.7	—	6.1	2.1	6.1
V. Social Services	1.0	16.5	5.7	8.0	—	2.6	4.3
VI. Personal Services	0.9	18.1	14.3	4.2	6.9	—	3.1
30-45 yrs. of age							
I. Extractive	—	14.1	5.1	0.6	2.4	1.1	0.7
II. Transformative	1.1	—	5.3	1.9	2.5	1.3	11.4
III. Distributive Services	0.9	10.6	—	2.1	2.1	1.4	5.4
IV. Producer Services	0.6	8.4	4.7	—	4.6	1.8	6.9
V. Social Services	0.8	4.8	3.7	1.5	—	1.0	5.5
VI. Personal Services	0.8	10.3	9.0	2.3	2.9	—	6.7
Over 45 yrs. of age							
I. Extractive	—	6.0	2.6	0.9	2.1	1.4	0.2
II. Transformative	0.6	—	2.4	1.0	1.9	1.2	5.2
III. Distributive Services	0.5	3.8	—	1.3	2.3	1.3	5.8
IV. Producer Services	0.6	3.4	2.4	—	3.5	1.1	3.0
V. Social Services	0.3	2.8	1.7	1.5	—	0.7	2.9
VI. Personal Services	0.8	3.4	6.0	1.7	3.6	—	2.3

Table III - 12

PERCENT OF TOTAL INTER-SECTOR SHIFTS OF MALE EMPLOYMENT BETWEEN 1965 AND 1970, BY AGE

1965 Industry Sector		1970 Industry Sector I	II	III	IV	V	VI	Total
Under 30 years of age								
I.	Extractive	--	56.7	23.2	2.8	8.9	8.4	100.0
II.	Transformative	7.4	--	51.5	12.8	16.7	11.8	100.2
III.	Distributive services	3.8	57.6	--	13.4	17.6	7.8	100.2
IV.	Producer services	0.0	41.4	33.1	--	18.9	6.5	99.9
V.	Social services	3.0	48.8	16.9	23.7	--	7.7	100.1
VI.	Personal services	2.0	40.8	32.2	9.5	15.5	--	100.0
30-45 years of age								
I.	Extractive	--	60.5	21.9	2.6	10.3	4.7	100.0
II.	Transformative	9.1	--	43.8	15.7	20.7	10.7	100.0
III.	Distributive services	5.3	62.0	--	12.3	12.3	8.2	100.1
IV.	Producer services	3.0	41.8	23.4	--	22.9	9.0	100.1
V.	Social services	6.8	40.7	31.4	12.7	--	8.5	100.1
VI.	Personal services	3.2	40.7	35.6	9.1	11.5	--	100.1
Over 45 years of age								
I.	Extractive	--	46.2	20.0	6.9	16.2	10.8	100.1
II.	Transformative	8.4	--	33.8	14.1	26.8	16.9	100.0
III.	Distributive services	5.4	41.3	--	14.1	25.0	14.1	99.9
IV.	Producer services	5.4	30.9	21.8	--	31.8	10.0	99.9
V.	Social services	4.3	40.0	24.3	21.4	--	10.0	100.0
VI.	Personal services	5.2	21.9	38.7	11.0	23.2	--	100.0

Table III - 13

PERCENT OF FEMALES EMPLOYED IN 1965 REMAINING IN THE SAME INDUSTRY SECTOR IN 1970, BY AGE CATEGORIES OF 1970

Industry Sector	Under 30	30-45	Over 45	Total
Extractive	32.1	51.6	42.3	42.4
Transformative	43.2	64.0	69.9	66.1
Distributive Services	29.5	60.2	64.3	55.5
Producer Services	36.1	56.8	64.7	53.9
Social Services	47.1	71.4	72.6	67.6
Personal Services	29.8	54.8	58.9	52.3

The Extractive and Personal services sectors have the lowest degree of continuity of employment and they also experienced a decline in their proportion of total employment during the 1960-70 period. In the same vein, the two industry sectors with the largest increase in proportional employment between 1960 and 1970, Social and Producer services, also account for higher degrees of employment stability. The only exception to this relationship is the Transformative sector which had the second highest proportion of females continuing work in that sector, yet it lost 2.6 percentage points of its share of total female employment between 1960 and 1970.

The relative position of industry sectors in regard to employment stability does not change much when age is introduced as a control variable. Again, this finding is consistent with the situation of male employment. Social services and Transformative sectors, for example, are characterized by the highest shares of female employment continuing in the same sector in all three age groups. The only significant difference is the extremely low proportion of females under 30 years of age that remained in the Distributive sector between 1965 and 1970, as compared with the proportion of female employment in the other two age groups that continued work in Distributive services. Within the youngest age group, however, Distributive services are not that much different from Personal services and Extractive in regard to employment continuity: in all three sectors, less than one-third of female employment continued in its respective sector during 1965-70.

In contrast to males, however, who maintained the highest levels of employment stability in the age group 30-45 years, females are the more likely to continue in the same industry sector in the oldest age group (over 45 years). The only exception to this pattern is the Extractive sector.

Given the low proportion of females that remained in their respective industry sector between 1965-70, it is even more mandatory than in the case of males to ask: Where did those women go? Do women move to other industry sectors in greater proportions than men, or are they more likely to leave the labor force as such? Based on the findings from previous studies about female labor force participation (e.g., Bowen and Finegan, 1969; Oppenheimer, 1972; Youssef, 1974), it is expected that women will leave the labor force in larger numbers than males. This should hold for all age groups, although for different reasons. The youngest age group (under 30 years of age) includes the ages when women have the majority of their children. It therefore should be expected that this age group has the highest proportions of women leaving the labor force.

In a recent article Valerie Oppenheimer examined the "interaction of men's occupational and family life cycles" (1974). Her conclusions included the statement that "For many American families...increases in the husband's earnings over time that are typically associated with changes in his occupational life-cycle stage do not really seem to parallel increases in the cost of living associated with a more advanced stage of the family life cycle" (Oppenheimer, 1974:244). It is during the time when the wife is between 30-35 and 45-50 that the needs of additional income are the highest. Assuming a close relationship of the female labor force participation and the life cycle of the family (which has been demonstrated in different contexts by Cain, 1966, and Sweet, 1973, among others), we can expect that women between the ages of 30 and 45 enter the labor force in relatively large numbers to provide the needed supplement to family income. Once this life-cycle squeeze is over, however, a large proportion of married women can be expected to leave the labor force again. For this reason, the proportion of women aged 30-45 that leave the labor force is expected to be very similar to that for women over 45 years of age.

An inspection of Table III-14 confirms these expectations. In all industry sectors for all three age groups females leave the labor force in much higher proportions than do males. Moreover, women under 30 years of age have the highest proportions of labor force exits. Finally, not much difference exists between the other two age groups, as was expected. In general, about one-fourth of those employed in a given industry sector in 1965 had left the labor force by 1970. This pattern is quite different from that observed for males who are very unlikely to leave the labor force during the ages of 30 to 45 years.

The other important difference between male and female employment is the fact that in all six industry sectors, regardless of age, the number of females changing industry sectors is much smaller than the number of females leaving the labor force. For males this pattern exists only for the age group over 45. Moreover, females also are less likely than males to change industry sectors. This finding is somewhat surprising, for very large proportions of females are to be found in clerical, service, and operative occupations. Many of these occupations, such as secretaries, involve skills that would seem to be easily transferable so it could have been expected that women would change industry sectors in larger proportions than males. In sum, the data in Table III-14 suggest that the smaller proportion of females remaining in the same industry sector is primarily the result of women leaving the labor force.

The final question to be addressed in this chapter is, Where do those women go who leave a given industry sector and remain in the labor force? In contrast to the male labor force, which is most likely to change to Transformative industries, Social services absorb the largest proportions of females changing industry sectors. Table III-15 shows further that hardly any women move into Extractive industries, the highest proportion being 0.3 percent of employment in any given industry sector.

In order to compare the relative proportions of inter-sector shifts of employment among industry sectors, Table III-16 shows the percentage distribution of all females in a given sector who had left that particular sector by 1970. Besides demonstrating even more clearly that Social services absorb the largest proportions of inter-industry shifts of employment, these data reveal some additional features. Consistent with the male pattern, females over 45 years of age are less likely to enter Transformative industries than younger females. But most interesting is the finding that women who left the Extractive sector are more likely to enter Transformative industries than Social services. This pattern is particularly striking for the age group 30-45 years, for which only 8.6 percent of all women who left the Extractive sector between 1965 and 1970 for another industry sector went to Social services by 1970. Furthermore, a disproportionately large number

Table III-14

PERCENT OF FEMALES EMPLOYED IN 1965 WHO CHANGED SECTORS OR LEFT THE LABOR FORCE BETWEEN 1965 AND 1970, BY AGE CATEGORIES OF 1970

1965 Industry Sector	Changing Sectors 1965-1970			Leaving Labor Force 1965-1970		
	Under 30	30-45	Over 45	Under 30	30-45	Over 45
Extractive	30.8	24.3	18.6	37.0	24.2	39.1
Transformative	14.8	11.1	5.9	41.8	24.9	24.2
Distributive Services	24.7	15.7	9.2	45.8	24.4	26.6
Producer Services	20.1	18.0	12.4	43.8	24.9	22.8
Social Services	11.5	7.1	4.4	41.4	21.9	23.0
Personal Services	27.6	17.9	10.7	42.4	27.3	30.4

Table III-15

INTER-INDUSTRY EMPLOYMENT SHIFTS OF FEMALES BETWEEN 1965 AND 1970, BY AGE
(PERCENTAGES BASED ON 1965 LABOR FORCE)

1965 Industry Sector	1970 Industry Sector						Intra-Sector Shift
	I	II	III	IV	V	VI	
Under 30 yrs. of age							
I. Extractive	--	7.4	4.9	1.2	9.9	7.4	0.0
II. Transformative	0.2	--	4.4	4.5	3.5	2.2	8.3
III. Distributive	0.3	7.6	--	5.9	8.3	2.6	4.1
IV. Producer	0.2	6.1	5.1	--	7.0	1.7	6.1
V. Social	0.3	3.7	2.2	2.7	--	2.6	7.0
VI Personal	0.3	8.3	5.6	4.4	9.0	--	3.8
30 - 45 yrs. of age							
I. Extractive	--	9.5	3.2	1.1	2.1	8.4	0.0
II. Transformative	0.3	--	3.6	1.3	3.8	2.1	7.4
III. Distributive	0.0	4.4	--	3.2	5.1	3.0	3.1
IV. Producer	0.2	4.2	5.2	--	7.2	1.2	2.7
V. Social	0.1	2.8	1.8	1.2	--	1.2	7.4
VI. Personal	0.2	5.7	4.7	1.5	5.8	--	4.2
Over 45 yrs. of age							
I. Extractive	--	4.5	3.6	0.5	4.1	5.9	0.0
II. Transformative	0.1	--	2.0	0.8	2.0	1.0	5.3
III. Distributive	0.1	2.4	--	1.7	3.3	1.7	1.2
IV. Producer	0.0	2.5	2.9	--	5.4	1.6	2.5
V. Social	0.1	1.1	1.0	0.7	--	1.5	4.8
VI. Personal	0.2	2.0	2.7	1.1	4.7	--	2.9

Table III-16

PERCENT OF TOTAL INTER-SECTOR SHIFTS OF FEMALE EMPLOYMENT BETWEEN 1965 and 1970, BY AGE

1965 Industry Sector	1970 Industry Sector						
	I	II	III	IV	V	VI	Total
Under 30 Years of Age							
I. Extractive	--	24.0	15.9	3.9	32.0	24.0	99.8
II. Transformative	1.4	--	29.7	30.4	23.6	14.9	100.0
III. Distributive Svcs.	1.2	30.8	--	23.9	33.6	10.5	100.0
IV. Producer Services	1.0	30.3	25.4	--	34.8	8.5	100.0
V. Social Services	2.6	32.2	19.1	23.5	--	22.6	100.0
VI. Personal Services	1.2	30.1	20.3	15.9	32.6	--	100.1
30-45 Years of Age							
I. Extractive	--	39.1	13.2	4.5	8.6	34.6	100.0
II. Transformative	2.7	--	32.4	11.7	34.2	18.9	99.9
III. Distributive Svcs.	0.0	28.0	--	20.4	32.5	19.1	100.0
IV. Producer Services	1.1	23.3	28.9	--	40.0	6.7	100.0
V. Social Services	1.4	39.4	25.3	16.9	--	16.9	99.9
VI. Personal Services	1.1	31.8	26.3	8.4	32.4	--	100.0
Over 45 Years of Age							
I. Extractive	--	24.2	19.4	2.7	22.0	31.7	100.0
II. Transformative	1.7	--	33.9	13.6	33.9	17.0	100.0
III. Distributive Svcs.	1.1	26.1	--	18.5	35.9	18.5	100.1
IV. Producer Services	0.0	20.2	23.4	--	43.6	12.9	100.1
V. Social Services	2.3	25.0	22.7	15.9	--	34.1	100.0
VI. Personal Services	1.9	18.7	25.2	10.3	43.9	--	100.0

of females who had been in the Extractive sector moved into Personal services. Although at this point female employment in Extractive industries does not account for a sizeable proportion of total female employment, one could ask if this same pattern existed when women were more numerous in Extractive industries.

The foregoing analysis of inter-industry shifts of employment suggests, for males as well as females, that the sectoral transformation of the labor force towards Producer and Social services has not been mainly brought about by persons moving into these two sectors from other industries. It is true that females did move to Social services in larger numbers than to any other industry sector, but it also must be kept in mind that for females Social services are the most important source of employment. It therefore is expected that this sector receives the largest proportions of total inter-sector shifts.

How then did the growth of employment in services come about? The way by which the sectoral transformation of the labor force takes place is a complex process. Various movements occur simultaneously, some of which have been already discussed. Drawing in part upon the earlier discussion, we now can fully identify the various mechanisms of the sectoral transformation of the labor force. Changes in the number of persons employed in sector X during the time period T_0 - T_1 can be separated into the following components:

(1) the number of persons employed in sector X in T_0 who remained in sector X by T_1;

(2) the number of persons employed in sector X in T_0 who moved to a different sector by T_1;

(3) the number of persons employed in sector X in T_0 who left the labor force by T_1;

(4) the number of persons employed in different sectors in T_0 who entered sector X by T_1;

(5) the number of persons not in the labor force in T_0 who were employed in sector X by T_1.

This procedure demonstrates that we must examine the 1965 and 1970 labor force simultaneously to show how inter-industry shifts and the sectoral transformation of the labor force are related.

The main shortcoming of this approach is the fact that it is restricted to two points in time. It would be preferable, to be sure, to have annual data, since in a given time period changes take place that are reflected neither in the data at the beginning of the time interval, nor in the data at the end of the interval. For example, it is possible that a person who was employed in the Social services sector in 1965 and 1970 worked in the Transformative sector from 1966 to 1969. This problem, however, is a general one whenever census data are used. Richard Stone (1975: 253-300), for instance, noted that in dealing with the changes of a population during a specific time interval census data yield no information about persons who are born after the initial date but who die before the closing of the interval, or about persons who enter and leave the country during this time period. On the other hand, the great amount of information contained in census data, and its large sample size, as in the case of the Public Use Sample tapes, have advantages that most surveys do not offer.

The identification of the different components by which an industry sector changes its employment during a given time period permits us to examine the extent to which inter-sector shifts of employment contributed to the changes in the distribution of the labor force by industry sectors. For each sector we know the number of persons employed in 1965 and 1970. The difference between the two numbers is the result of: (a) persons moving from one industry sector to another; and (b) persons entering and leaving the labor force. For example, some persons who were employed in a certain industry sector in 1965 leave this sector by 1970. During the same time this sector receives persons by 1970 who had been employed elsewhere in 1965. The same situation exists for labor force entries and exits. Some persons who were employed in an industry sector in 1965 left the labor force by 1970, while the total employment in that sector in 1970 includes persons who were not in the labor force in 1965. For these reasons, it is *net* entries and the *net* sector shifts of employment which produce changes in the number of persons employed in an industry sector during a given time. Thus,

$$N_{i1970} - N_{i1965} = (LE_{i1970} - LEX_{i1965}) + (SE_{i1970} - SEX_{i1965})$$

where: N_i is the number of persons in the *ith* sector,

LE_{1970} is the number of persons in the *ith* sector in 1970 who who were not in the labor force in 1965,

LEX_{1965} is the number of persons in the *ith* sector in 1965 who left the labor force by 1970,

SE_{1970} is the number of persons in the *ith* sector who had been in a different sector in 1965, and

SEX_{1965} is the number of persons in the *ith* sector in 1965 who went to another sector by 1970.

These data were computed for all industry sectors and the net entries and net sector shifts are presented in Table III-17 for males and Table III-18 for females. Negative net entries refer to the situation in which a sector experienced more labor force exits than entries during the 1965-70 period. Negative net sector shifts occur when the number of persons leaving one sector for another is larger than the number of persons entering that sector from a different sector during 1965-70.

Male employment in the Extractive sector (Table III-17) will serve as an explanation of the nature of these tables. The Extractive sector experienced a decline in absolute numbers of employed males between 1965 and 1970, the difference

Table III-17

COMPONENTS OF EMPLOYMENT GROWTH IN INDUSTRY SECTORS,
MALE LABOR FORCE, 1965-1970

Industry Sector	1965 Labor Force (1)	1970 Labor Force (2)	Difference (3)=(2)-(1)	Net Entry (4)	Net Sector Shift (5)	Difference (6) = (3)	Net Entry (7)=(4)/(3)	Net Sector Shift (8)=(5)/(3)
Extractive	3,116	2,769	-347	-31	-316	100.0	8.9	91.1
Transformative	16,326	17,174	848	895	-47	100.0	105.5	-5.5
Distributive Services	8,561	9,877	1,316	1,332	-16	100.0	101.2	-1.2
Producer Services	2,521	3,100	579	393	186	100.0	67.9	32.1
Social Services	5,077	6,432	1,355	990	365	100.0	73.1	26.9
Personal Services	2,691	3,039	348	522	-174	100.0	150.0	-50.0

Table III-18

COMPONENTS OF EMPLOYMENT GROWTH IN INDUSTRY SECTORS, FEMALE LABOR FORCE, 1965-1970

Industry Sector	1965 Labor Force (1)	1970 Labor Force (2)	Difference (3)=(2)-(1)	Net Entry (4)	Net Sector Shift (5)	Difference (6)=(3)	Net Entry (7)=(4)/(3)	Net Sector Shift (8)=(5)/(3)
Extractive	396	331	-65	- 7	-58	100.0	10.8	89.2
Transformative	4858	5592	734	633	101	100.0	86.2	13.8
Distributive Services	4149	5024	875	996	-121	100.0	113.8	-13.8
Producer Services	2027	2465	438	418	20	100.0	95.4	4.6
Social Services	6283	8501	2218	1931	287	100.0	87.1	12.9
Personal Services	3503	3982	479	708	-229	100.0	147.8	-47.8

NOTE: Figures based on 1/1000 Public Use Sample being - 347 (Column 3). (Note that these numbers are drawn from the 1/1000 rather than the 1/100 Public Use Sample.) Labor force exits from the Extractive sector during 1960-70 were larger than labor force entries by 31 (Column 4) and the total amount of males leaving the Extractive sector during 1965-70 for another sector exceeded the number of males entering the Extractive sector from other industries by 316 (Column 5). Columns 7 and 8 respectively, refer to the proportion that net entries and net sector shifts account of the difference in employment between 1965 and 1970 (Column 3) for each sector.

The data in Tables III-17 and III-18 show that net sector shifts account for around 90 percent of the total decline of males and females in the Extractive sector. This sector lost more employment to other sectors than it received during 1965-70. Also, fewer workers entered Extractive industries than left in that period, contributing further to the decline of employment in that sector.

Aside from the Extractive sector, however, net entries accounted for larger proportions of the employment differences as compared to net sector shifts in all other industry sectors. The patterns are quite similar for males and females, but the magnitudes of the proportions vary somewhat. It is noteworthy that for males all industry sectors but the Producer and Social services have negative net sector shifts of employment. Thus, these two service sectors were the sole beneficiaries of the inter-sector shifts of employment. But even for these sectors, net entries account for a larger share of the increase in employment between 1965 and 1970 than net sector shifts.

For females the importance of net entries for the growth of employment in Producer and Social service is even more pronounced. As in the case of males, female labor force entries by far outnumber exits in Distributive and Personal services. These two sectors, however, increased their employment less than could have been expected from the net entries, since they lost many more females to other sectors than they received. The only sector besides Producer and Social services with a positive net sector shift were Transformative industries.

While the data presented in Tables III-17 and III-18 explain the growth of the industry sectors in absolute numbers, they do not yet permit us to evaluate the relative importance of net entries and net sector shifts as sources for the sectoral transformation of the labor force. Since the total labor force expanded between 1965 and 1970, it can be expected that each sector increased in numbers as well. As a result, net entries are more important than net sector shifts for the absolute growth of employment in industry sectors.

But the sectoral transformation of the labor force is due to the fact that in some sectors employment will increase at a faster rate than the total labor force, whereas it will increase more slowly or even may decline in other sectors. For this reason, the growth of employment in each industry sector must be related to the growth of total employment. Thus, in order to assess the importance of net entries in each sector independent of the growth of total employment, we must assume that each sector increases in numbers at the same rate as the labor force. This is done by multiplying the number of persons employed in each sector in 1965 (see

Tables III-17 and III-18) by the growth factors of the male and female labor forces, respectively. The difference between the expected number of persons employed in a given sector in 1970 and the number of persons employed in that sector in 1965 is the expected growth. We then computed the difference between the actual growth and the expected growth of employment in each sector, which we call net shift. Positive net shifts indicate that the employment in that sector increased faster than expected, while negative net shifts indicate a slower growth than expected.

Since we assume that employment in each sector shows the same rate of growth as the labor force, the expected growth in each sector is due entirely to net entries. For this reason, the expected growth is subtracted from the net entries (given in Column 4 in Tables III-17 and III-18), and this difference is called net entry shifts. Positive net entry shifts indicate that the actual net entries exceed the expected net entries, and negative net entry shifts are obtained when the number of expected net entries is larger than the number of actual net entries.

The procedure outlined above permits us to evaluate the relative importance of net entry shifts and net sector shifts for the sectoral transformation of the labor force. The results are presented in Table III-19 and III-20.

The case of males in Social services will serve as an example for the interpretation of the tables. Table III-19 shows that the actual growth of males in Social services exceeded the expected growth by 812 (Column 3). Column 4 indicates that the actual number of net entries in Social services were larger than the expected net entries by 447; the net entry shift therefore accounts for 55 percent (Column 7) of the net shift in Social services. Similarly, Social services received 365 more males from other sectors than it lost to those sectors between 1965 and 1970 (Column 5); the net sector shift thus is responsible for 45 percent of the net shift (Column 8).

The results show for males that the net entry shifts were more important for the proportionate changes of employment than the net sector shifts in all industry sectors except Producer services, but this difference was only moderate in the Extractive and Social services sectors. Of particular interest is the case of Personal services. This sector received many more net entries than expected, but due to the large negative net sector shift, the proportionate growth of employment in Personal services was only slight.

The patterns for females resemble the situation for males in the Extractive and Social services sectors. For example, the proportionate growth of the employment of females in Social services was mainly due to the fact that the net entries of females into this sector were larger than expected; net entry shifts therefore explain about two-thirds of the net shift of employment in Social services.

In the four remaining sectors, however, the relationship between net entry shifts and net sector shifts is different for females and males. The proportionate decline of female employment in the Transformative sector is due entirely to the deficit in net entry shifts. Indeed, had not more females entered Transformative industries from other sectors than left during the 1965-70 period, the proportionate decrease of the Transformative sector would have been even more severe.

Table III-19

COMPONENTS OF THE SECTORAL TRANSFORMATION OF THE MALE LABOR FORCE, 1965 - 1970

Industry Sector	Actual Growth (1)	Expected Growth (2)	Net Shift (3)=(1)-(2)	Net Entry Shift (4)	Net Sector Shift (5)	Net Shift (6)=(3)	Net Entry Shift (7)=(4)/(3)	Net Sector Shift (8)=(5)/(3)
Extractive	-347	334	-681	-365	-316	100.0	53.6	46.4
Transformative	848	1,748	-900	-853	-47	100.0	94.8	5.2
Distributive Services	1,316	916	400	416	-16	100.0	104.0	-4.0
Producer Services	579	270	309	123	186	100.0	39.8	60.2
Social Services	1,355	543	812	447	365	100.0	55.0	45.0
Personal Services	348	288	60	234	-174	100.0	390.0	-290.0

Growth Factor: $\frac{\text{1970 Male Labor Force}}{\text{1965 Male Labor Force}} = \frac{42,391}{38,292} = 1.1070458$

NOTE: These figures are based on the 1/1000 Public Use Sample, 1970.

Table III-20

COMPONENTS OF THE SECTORAL TRANSFORMATION OF THE FEMALE LABOR FORCE, 1965-1970

Industry Sector	Actual Growth (1)	Expected Growth (2)	Net Shift (3)=(1)-(2)	Net Entry Shift (4)	Net Sector Shift (5)	Net Shift (6)=(3)	Net Entry Shift (7)=(4)/(3)	Net Sector Shift (8)=(5)/(3)
Extractive	-65	87	-152	-94	-58	100.0	61.8	38.2
Transformative	734	1071	-337	-438	101	100.0	130.0	-30.0
Distributive Services	875	915	-40	81	-121	100.0	-202.5	302.5
Producer Services	438	447	-9	-29	20	100.0	322.2	-222.2
Social Services	2218	1386	832	545	287	100.0	65.5	34.5
Personal Services	479	776	-297	-68	-229	100.0	22.9	77.1

Growth Factor: $\frac{\text{1970 Female Labor Force}}{\text{1965 Female Labor Force}} = \frac{25,895}{21,216} = 1.2205411$

NOTE: The figures are based on the 1/1000 Public Use Sample, 1970.

Although both males and females had positive net entry shifts in the Distributive services sector, it was much smaller for females. On the other hand, females had larger negative net sector shifts than males; as a result, the proportionate employment of females in Distributive services declined between 1965 and 1970, whereas it increased for males.

Finally, the data show that the net entries of females in Personal services were less than expected, while the reverse was true for males. Since the deficit of net sector shifts was even larger, the proportionate employment of females in Personal services declined.

We conclude from the results that net entry shifts are a more important source for the sectoral transformation of the labor force than net sector shifts, although the latter have a moderate impact on the proportionate changes of employment in most sectors.

Chapter IV

AGE AND SECTORAL TRANSFORMATION

Age seldom has been given the attention it deserves in social science research. All too often it is relegated to the status of a "control" variable, introduced into an analysis only so that the relationship between two other variables can be more clearly specified, as for example in the relationship between occupation and voting behavior. Lately, however, age is coming to be conceived of as worthy of consideration in its own right (see, for example, the three volume series on Aging and Society, especially Vol.3, A Sociology of Age Stratification, Riley, Johnson and Foner, 1972).

In the field of population age always has been a central variable, crucial for the very existence of the population model. As Ryder (1964: 449) aptly puts it:

> Age is the central variable in the demographic model. It identifies birth cohort membership ... It is a measure of the interval of time spent within the population, and thus of exposure to the risk of occurrence of the event of leaving the population, and more generally is a surrogate for the experience which causes changing probabilities of behavior of various kinds.

This project, and the census data on which it is based, does not permit a full elaboration of the potential of age as a variable, but it can contribute importantly to our knowledge of the structure and transformation of the labor force. The latter continually is being altered as a consequence of entries and exits of persons with different background characteristics who occupy different work positions. In addition, persons already in the labor force continually shift from one job to another. These myriad movements in the aggregate constitute the labor force transformation. As already has been seen in Chapter III, an important characteristic of this transformation is the age component.

In Table IV-1 the sectoral and industry distributions for the total labor force are presented by ten-year age intervals from 15-64. (This omits a few youngsters of 14 and a good deal more people 65 and over, but their absence does not significantly affect the discussion to follow.) The distributions are provided for 1960 and for 1970.

Let us first look at the pattern of distribution by age; since the relationships do not vary greatly from 1960 to 1970 we shall discuss only 1970. It is no surprise that the age category with the highest share of the total labor force in the Extractive sector is the oldest one, 55-64, for agriculture has been declining absolutely and relatively for several decades. The other five sectors all have their peak percentage in the younger age categories: Distributive and Personal services in the youngest category 15-24, and Transformative, Producer, and Social services in the 25-34 category.

Another way to examine the age distribution is to look at the direction of change in relative size from the youngest to the oldest age category. In

Table IV-1

PERCENTAGE DISTRIBUTION OF AGE GROUPS BY SECTOR AND INDUSTRY, TOTAL LABOR FORCE, 1960 AND 1970

Sectors and Industries	AGE GROUPS									
	15-24		25-34		35-44		45-54		55-64	
	1960	1970	1960	1970	1960	1970	1960	1970	1960	1970
I. *EXTRACTIVE*	8.1	3.7	6.3	3.5	6.7	4.1	8.2	4.6	9.7	6.1
1) Agriculture	7.4	3.2	5.1	2.6	5.6	3.1	7.0	3.6	8.7	5.2
2) Mining	.7	.5	1.2	.9	1.2	.9	1.2	1.0	1.0	.9
II. *TRANSFORMATIVE*	31.4	27.5	39.7	36.6	39.0	36.1	35.6	35.3	32.3	32.4
3) Construction	4.7	4.0	6.8	6.3	6.7	6.6	6.2	6.1	6.2	5.9
4) Food	2.8	1.7	3.4	2.1	3.3	2.2	3.1	2.2	2.8	2.2
5) Textile	3.2	2.7	3.3	2.9	3.7	3.1	3.8	3.3	3.2	3.4
6) Metal	2.7	2.4	4.1	3.4	4.2	3.6	3.7	3.8	3.3	3.5
7) Machinery	6.3	6.9	9.6	10.2	9.4	9.2	7.7	8.9	6.6	7.1
8) Chemical	1.2	1.2	2.3	1.9	2.2	1.9	1.9	1.8	1.6	1.5
9) Misc. manufacturing	9.4	7.6	8.6	8.2	8.0	8.1	7.8	7.6	7.0	7.4
10) Utilities	1.1	.9	1.7	1.5	1.5	1.5	1.4	1.5	1.7	1.5
III. *DISTRIBUTIVE SERVICES*	25.2	26.3	21.1	20.6	21.5	21.5	21.5	21.6	21.4	21.5
11) Transportation	2.7	2.6	4.5	4.2	4.8	4.3	4.8	4.4	5.5	4.3
12) Communication	1.9	2.2	1.9	1.8	1.2	1.7	.9	1.2	.9	.8
13) Wholesale	3.2	3.4	3.9	4.4	3.8	4.5	3.6	4.3	3.4	4.0
14) Retail	17.5	18.1	10.8	10.3	11.6	11.0	12.2	11.8	11.7	12.5
IV. *PRODUCER SERVICES*	7.6	8.7	7.3	9.2	6.1	8.0	5.9	7.3	6.5	7.1
15) Banking	2.7	3.0	1.9	2.6	1.3	2.0	1.3	1.6	1.4	1.6
16) Insurance	2.3	2.2	2.1	2.0	1.7	1.8	1.5	1.7	1.4	1.5
17) Real Estate	.4	.5	.6	.7	.8	1.0	1.1	1.3	1.6	1.5
18) Engineering	.3	.4	.5	.6	.3	.5	.2	.4	.2	.3
19) Accounting	.2	.4	.3	.5	.3	.4	.2	.3	.2	.3
20) Misc. business serv.	1.3	1.9	1.4	2.1	1.3	1.8	1.1	1.6	1.1	1.4
21) Legal services	.4	.4	.5	.7	.4	.5	.4	.5	.5	.5
V. *SOCIAL SERVICES*	14.3	20.5	16.4	22.5	16.4	22.2	17.3	22.1	17.4	22.2
22) Medical services	1.0	2.0	1.2	1.8	1.5	2.2	1.6	2.3	1.7	2.3
23) Hospitals	3.6	4.3	3.0	3.9	2.4	3.5	2.6	3.4	2.6	3.6
24) Education	5.6	9.3	5.5	9.5	4.9	8.4	6.0	7.6	6.0	8.3
25) Welfare	.7	.9	.8	1.1	.8	1.2	1.0	1.1	1.3	1.5
26) Nonprofit	.4	.4	.3	.4	.3	.4	.4	.4	.5	.5
27) Postal services	.4	.5	.9	.8	1.2	1.2	1.0	1.5	.9	1.1
28) Government	2.4	2.9	4.6	4.7	5.1	5.1	4.5	5.6	4.3	4.7
29) Misc. social serv.	.1	.2	.2	.3	.2	.3	.1	.2	.1	.2
VI. *PERSONAL SERVICES*	13.4	13.3	9.2	7.6	10.3	8.2	11.5	9.1	12.8	10.7
30) Domestic services	4.0	1.7	1.9	.8	2.3	1.1	3.1	1.6	4.2	2.7
31) Hotels	.9	.9	.6	.7	.8	.8	1.1	.9	1.5	1.3
32) Eating & drinking	3.8	6.0	2.6	2.4	2.9	2.7	3.0	2.7	2.8	2.6
33) Repair	1.4	1.3	1.5	1.3	1.4	1.3	1.3	1.2	1.2	1.2
34) Laundry	.9	.6	.9	.5	1.1	.7	1.1	.9	1.1	1.0
35) Barber & beauty shop	.8	1.1	.7	1.0	.9	.7	.8	.8	.8	.8
36) Entertainment	1.4	1.3	.7	.7	.6	.6	.7	.6	.8	.8
37) Misc. personal serv.	.3	.2	.3	.2	.3	.2	.4	.3	.5	.4
TOTAL LABOR FORCE	100.0	100.0	100.0	100.0	100.0	100.1	100.0	100.0	100.1	100.0

Extractive it moves fairly regularly upward, from 3.7 to 6.1%, but for Transformative there is a jump from 27.5% to 36.6% in the 25-34 category, after which it declines to 32.4% in the oldest interval. The pattern for the Distributive sector is quite different, falling from 26.3% in the 15-24 category to 20.6% in the next oldest one, after which there is little change. This steep drop is due almost entirely to the influence of retail trade, which drops from 18.1% (nearly one-fifth of the entire labor force) to 10.3%.

The profile for Producer services shows a slight rise to 9.2% in the 25-34 category, followed by a modest decline to 7.1% in the oldest category. Social services has the flattest of all profiles, with two percentage points encompassing the range. Personal services begins high (13.3%), then drops sharply (to 7.6%) in the 25-34 category, after which it rises steadily.

In terms of the age distribution, the Distributive sector in particular, as well as Personal and Producer services, are likely to be entry sectors, while the other sectors have their strongest representation in the next older category, save for Extractive, which reflects its declining importance within the total labor force by its age distribution.

Tables IV-2 and IV-3 provide the same distributions for male and female, and we need not go over them in the detail that was given for the total population. The sex effect mainly is sharpened, especially for the males. For the latter, the Distributive declines much more, with retail having a remarkable drop from 20.5% in the 15-24 category to 10.3% in the 25-34 category, after which it levels off. Similarly, Personal services drop from 11.3% to 5.3% for the comparable age categories. The major difference between the sexes is in Producer services where the male gain over the age range is countered by a sizeable female decline, from 12.7% in 15-24 group steadily down to 7.4% in the 55-64 group. Personal services also differs, in that females have somewhat higher percentages in the oldest age category than the youngest one.

The intercensal changes are more pronounced by sex than for the total labor force. Many of the sectors and industries show relatively little change for the 1960-1970 period, but after all a decade is not very long a time for such changes to happen. Distributive services for males is exceptionally stable, and Transformative also is quite stable. The decline for males in Extractive between 1960 and 1970 occurs for virtually all age categories and the same is true for the increase in Social services. For females the decline in Transformative is important for the first three age groups but after that the last two show little change. The pronounced decline in Personal services is present for all age categories. Social services have the widest gains for females, present in all age categories.

There is another way to present the age distribution by sex: a graphic presentation by age-sex pyramids. In Appendix C each of the sectors and industries, used till now, are given for 1960 and 1970 for the five age categories 15-64, plus the 65 and over group. The presentation is in percentage rather than absolute terms, so the volume of each pyramid in 1960 equals that in 1970.

In glancing through these 88 age-sex pyramids, it is immediately apparent how much variation there is in the sector and industry distributions. The thin band representing females in the Extractive and Transformative sectors vividly

Table IV-2

PERCENTAGE DISTRIBUTION OF AGE GROUPS BY SECTOR AND INDUSTRY
TOTAL MALE LABOR FORCE, 1960 AND 1970

Sectors and Industries	15-24		25-34		35-44		45-54		55-64	
	1960	1970	1960	1970	1960	1970	1960	1970	1960	1970
I. *EXTRACTIVE*	12.1	5.9	7.9	4.7	8.9	5.6	11.1	6.7	12.8	8.9
1) Agriculture	11.1	5.1	6.3	3.5	7.2	4.3	9.4	5.2	11.4	7.5
2) Mining	1.0	.8	1.6	1.2	1.6	1.4	1.7	1.5	1.4	1.3
II. *TRANSFORMATIVE*	38.1	35.6	44.7	43.5	44.6	43.2	41.9	42.7	38.3	39.9
3) Construction	7.3	6.8	9.1	9.0	9.4	9.7	8.9	9.2	8.6	8.8
4) Food	3.4	2.2	3.8	2.5	3.5	2.5	3.5	2.5	3.1	2.5
5) Textile	2.3	1.9	1.9	1.6	2.0	1.6	2.2	1.7	2.1	2.0
6) Metal	3.5	3.6	5.0	4.5	5.4	4.8	4.9	5.3	4.3	5.0
7) Machinery	7.4	8.7	11.0	12.4	11.0	11.2	9.4	11.0	8.3	9.0
8) Chemical	1.3	1.5	2.7	2.3	2.7	2.3	2.5	2.4	2.0	1.9
9) Misc. manufacturing	11.8	9.6	9.3	9.1	8.6	9.0	8.7	8.4	7.8	8.5
10) Utilities	1.2	1.3	2.1	2.0	2.0	2.1	1.9	2.2	2.3	2.1
III. *DISTRIBUTIVE SERVICES*	27.4	29.3	22.2	22.6	22.2	22.4	22.2	22.3	22.2	22.1
11) Transportation	3.4	3.4	5.7	5.3	6.5	5.9	6.7	6.3	7.4	6.1
12) Communication	.9	1.4	1.5	1.6	1.1	1.5	.7	1.0	.7	.6
13) Wholesale	3.6	4.1	4.5	5.4	4.5	5.4	4.3	5.3	4.0	4.9
14) Retail	19.5	20.5	10.5	10.3	10.2	9.6	10.6	9.7	10.2	10.5
IV. *PRODUCER SERVICES*	4.1	5.3	6.5	8.1	5.6	7.4	5.5	6.6	6.4	6.9
15) Banking	1.1	1.4	1.4	1.9	.9	1.4	1.1	1.1	1.4	1.4
16) Insurance	.8	.9	1.9	1.7	1.6	1.8	1.4	1.6	1.3	1.3
17) Real Estate	.4	.5	.6	.6	.8	.9	1.1	1.2	1.7	1.6
18) Engineering	.3	.5	.6	.7	.4	.7	.3	.5	.3	.4
19) Accounting	.2	.4	.3	.5	.3	.3	.2	.3	.2	.3
20) Misc. business serv.	1.1	1.7	1.4	2.0	1.2	1.8	1.0	1.5	1.1	1.4
21) Legal services	.1	.1	.4	.6	.4	.5	.4	.4	.5	.5
V. *SOCIAL SERVICES*	8.6	12.6	12.7	15.7	12.6	16.1	11.9	15.8	11.9	15.3
22) Medical services	.3	.5	.7	.7	1.0	1.2	1.0	1.2	1.1	1.2
23) Hospitals	1.2	1.6	1.3	1.5	1.0	1.1	1.0	1.2	1.1	1.3
24) Education	3.5	6.2	3.8	6.2	2.7	5.0	2.8	3.9	3.0	4.4
25) Welfare	.6	.6	.7	.8	.7	1.0	.8	.8	1.0	1.1
26) Nonprofit	.3	.3	.2	.3	.2	.3	.3	.4	.4	.5
27) Postal services	.6	.7	1.1	.9	1.6	1.5	1.3	2.0	1.0	1.4
28) Government	2.0	2.5	4.7	5.0	5.2	5.7	4.6	6.2	4.2	5.1
29) Misc. social serv.	.1	.2	.2	.3	.2	.3	.1	.3	.1	.2
VI. *PERSONAL SERVICES*	9.8	11.3	6.0	5.3	6.1	5.3	7.4	5.9	8.4	7.0
30) Domestic services	1.2	.5	.3	.1	.3	.1	.5	.2	.7	.3
31) Hotels	.8	.8	.4	.4	.5	.4	.7	.6	1.1	.8
32) Eating & drinking	2.6	5.3	1.3	1.3	1.5	1.4	2.0	1.5	2.1	1.7
33) Repair	2.1	2.2	2.0	1.8	1.9	1.7	1.9	1.7	1.6	1.6
34) Laundry	.7	.4	.6	.3	.6	.4	.7	.6	.7	.7
35) Barber & beauty shop	.4	.3	.5	.5	.4	.4	.6	.4	.7	.6
36) Entertainment	1.6	1.6	.6	.6	.6	.6	.7	.6	.9	.9
37) Misc. personal serv.	.3	.3	.3	.2	.3	.2	.3	.3	.4	.4
TOTAL LABOR FORCE	100.1	100.0	100.0	99.9	100.0	100.0	100.0	100.0	100.0	100.1

Table IV-3

PERCENTAGE DISTRIBUTION OF AGE GROUPS BY SECTOR AND BY INDUSTRY, TOTAL FEMALE LABOR FORCE, 1960 AND 1970

Sectors and Industries	15-24		25-34		35-44		45-54		55-64	
	1960	1970	1960	1970	1960	1970	1960	1970	1960	1970
I. *EXTRACTIVE*	2.1	1.1	2.2	1.1	2.3	1.3	2.5	1.2	2.9	1.3
1) Agriculture	1.9	0.9	1.9	0.9	2.1	1.1	2.3	1.0	2.8	1.2
2) Mining	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1
II. *TRANSFORMATIVE*	21.2	17.8	26.9	22.8	27.2	23.3	23.5	23.0	19.1	19.5
3) Construction	0.9	0.7	1.1	1.0	1.1	1.0	1.1	0.9	0.9	0.9
4) Food	1.8	1.1	2.4	1.4	2.8	1.6	2.4	1.6	2.2	1.5
5) Textile	4.6	3.7	6.8	5.4	7.1	5.7	7.0	5.8	5.7	5.7
6) Metal	1.6	1.0	1.8	1.3	1.7	1.4	1.3	1.4	1.0	1.0
7) Machinery	4.6	4.7	6.1	5.7	6.1	5.4	4.4	5.5	2.8	3.7
8) Chemical	1.2	0.9	1.3	1.1	1.1	1.0	0.9	0.9	0.7	0.8
9) Misc. manufacturing	5.7	5.1	6.7	6.4	6.6	6.6	6.0	6.2	5.2	5.4
10) Utilities	0.9	0.5	0.8	0.5	0.5	0.4	0.5	0.5	0.5	0.4
III. *DISTRIBUTIVE SERVICES*	21.9	22.6	18.4	16.8	19.9	19.7	20.3	20.4	19.5	20.3
11) Transportation	1.5	1.6	1.5	2.0	1.3	1.5	1.2	1.3	1.2	1.0
12) Communication	3.5	3.2	2.9	2.1	1.6	1.9	1.5	1.3	1.3	1.0
13) Wholesale	2.5	2.6	2.5	2.5	2.3	2.7	2.2	2.6	2.0	2.3
14) Retail	14.4	15.2	11.4	10.2	14.6	13.5	15.4	15.2	15.0	15.8
IV. *PRODUCER SERVICES*	13.0	12.7	9.3	11.2	7.3	9.1	6.6	8.3	6.5	7.4
15) Banking	5.1	4.9	3.4	3.9	2.2	3.0	1.7	2.3	1.5	1.9
16) Insurance	4.6	3.7	2.6	2.5	1.8	1.9	1.8	1.9	1.5	1.7
17) Real Estate	0.6	0.6	0.6	0.8	0.9	1.1	1.1	1.3	1.5	1.4
18) Engineering	0.2	0.2	0.2	0.3	0.1	0.2	0.1	0.1	0.1	0.1
19) Accounting	0.2	0.4	0.3	0.5	0.3	0.5	0.2	0.4	0.2	0.3
20) Misc. business serv.	1.6	2.2	1.6	2.3	1.5	1.9	1.1	1.7	1.1	1.4
21) Legal services	0.7	0.8	0.6	0.9	0.5	0.5	0.4	0.5	0.5	0.6
V. *SOCIAL SERVICES*	22.9	30.0	25.7	35.9	24.4	33.2	27.7	32.5	29.4	34.3
22) Medical services	2.2	3.8	2.6	3.9	2.5	4.0	2.7	4.0	3.0	4.3
23) Hospitals	7.2	7.5	7.2	8.7	5.4	7.7	5.7	7.0	5.8	7.5
24) Education	8.7	13.0	9.6	16.2	9.4	14.4	12.3	13.7	12.7	14.9
25) Welfare	1.0	1.3	1.1	1.7	1.1	1.5	1.3	1.8	2.2	2.1
26) Nonprofit	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6
27) Postal services	0.1	0.4	0.3	0.6	0.4	0.6	0.5	0.6	0.6	0.6
28) Government	3.1	3.3	4.2	4.0	4.8	4.2	4.5	4.7	4.5	4.1
29) Misc. social serv.	0.1	0.2	0.2	0.4	0.2	0.2	0.1	0.2	0.2	0.2
VI. *PERSONAL SERVICES*	18.8	15.7	17.5	12.2	18.9	13.4	19.5	14.6	22.5	17.1
30) Domestic services	8.1	3.0	5.9	2.1	6.3	2.8	8.0	4.0	11.7	6.7
31) Hotels	1.0	1.1	1.2	1.4	1.4	1.4	1.8	1.5	2.4	2.0
32) Eating & drinking	5.4	7.0	5.8	4.5	5.7	5.1	4.9	4.7	4.1	4.2
33) Repair	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.3	0.4
34) Laundry	1.3	0.9	1.6	0.9	2.0	1.3	2.1	1.5	1.8	1.7
35) Barber & beauty shop	1.3	2.1	1.4	1.8	2.0	1.3	1.2	1.5	0.8	1.1
36) Entertainment	1.1	1.0	0.8	0.8	0.7	0.7	0.6	0.7	0.7	0.6
37) Misc. personal serv.	0.2	0.2	0.2	0.3	0.4	0.3	0.5	0.4	0.7	0.5
TOTAL LABOR FORCE	99.9	99.9	100.0	100.0	100.0	100.0	100.1	100.0	99.9	99.9

indicates the preponderance of males, excepting for textile, which is female dominated. Domestic service shows a reverse pattern, with males the slender band.

It is unnecessary to comment on each of the sectors and industries, for the graphic presentation is plain enough. Some general comments, however, are warranted:

1) In the youngest age category, 15-24, females often have a fairly broad base, thus resembling a general age-sex pyramid, but males frequently have a "notch" effect, due to the low representation in the youngest age group. This is understandable for industries such as engineering, legal and medical, which require a long training period, but it also is present in many Transformative industries.

2) Only a few of the pyramids display similar configurations on the male and female sides. In other words, in nearly all sectors and industries there is a clear difference in both the magnitude of sexual representation by age as well as the configurations the distributions assume. The sexual division of labor is manifest in most of the pyramids.

3) The 1960 and 1970 pyramids are, as could be expected, not strikingly different, especially since the percentage mode of presentation does not permit representation of changes in the size of the pyramids. For example, the 1970 agriculture pyramid would be only 60% the size of the 1960 one if the absolute figures were to be used. What is discernible in many of the pyramids is a tendency toward the flattening of the sides between 1960 and 1970, that is, for the proportion in the age groups to be somewhat more equal.

Let us now turn to a consideration of the growth of the population age groups between 1960 and 1970. More properly, we should speak of the change in the size of the five age groups, 15-64, during the decade, for we are not using a cohort approach; that is, taking the 15-24 age groups, for example, in 1960 and noting the "survivors" ten years later in the 25-34 age group. This approach is useful for the total population, but in the labor force, where many people, particularly females, enter, leave and re-enter a number of times, it is not warranted. Therefore, we will simply compare how many persons were in an age group in 1960 with the number in 1970 and compute the percentage change. To illustrate from Table IV-4, the sample size for the total 15-24 age group is 100,675 compared to 140,115 in 1970, a difference of 39,440 or a 39.2% increase. (These figures are from the 1% Public Use Sample and they differ from the published census reports not only because of sampling variation, but also because of other differences, i.e., the omission in our sample of persons allocated to industry and occupation in 1970. See Appendix A for a discussion of the 1960 and 1970 samples.)

There are striking differences in Table IV-4, differences that are due to a number of factors: size of the population in the initial period, changes in participation rates during the decade, etc. The range of the total population is from a 39.2% gain in the youngest age group to a decline of 4.6% in the 35-44 group. This decline is due wholly to the males, where there was a decline of nearly 10%. Outside of the 15-24 group, all the male age categories showed quite low increases or, in the one instance, of decrease. In contrast, the females, except for low growth in the 35-44 groups, have high percentage gains. They had

Table IV-4

PERCENT CHANGE IN AGE GROUPS IN LABOR FORCE, 1960-1970

Age Group	Total	Male	Female
15-24	39.2	26.5	58.4
25-34	10.6	2.8	30.1
35-44	-4.6	-9.7	6.0
45-54	11.3	5.3	23.0
55-64	16.6	8.0	35.5

twice the percentage increase of males in the youngest age group (a remarkable 58.4% increase!) and, in terms of relative gain, the difference between the sexes is even greater in three of the other four groups. Unquestionably, the major reason for these large differences is the substantial increase in female participation rates during the sixties, already mentioned in Chapter II. Since no prior decade had such a gain (8.9 percentage points, according to Table II-6) it seems unlikely that there will be any future decade that will witness as large a gain. To that extent, the 1960-1970 period is unusual.

In any event, the percent change in age groups is so different that this factor must be carefully taken into account when considering the relationship of age to sectoral transformation during the 1960-1970 period. Our attempt to do so is presented in the next section.

The Shift Approach as Applied to Age and Sectoral Transformation

The analyses of the age-sex distributions of sectors and industries for the 1960-1970 period have been useful, but admittedly they are limited in what they can tell us, particularly in addressing the question of change. At this point what is needed is a standard by which to evaluate the 1960-1970 change. The familiar practice of formulating an expected change and then comparing it with the actual change is our point of departure.

The standard proposed for the expected change is a simple one; namely, the growth rate of the total employed population for each of the five age categories (15-24, 25-34, 35-44, 45-54, 55-64). In other words, the basic assumption is that the five age categories for all sectors and all industries will grow at the same rates as the respective age categories for the total population. Against these expected changes can be placed the actual 1960-1970 growth. The difference between the two sets of figures will tell us the extent to which age categories for each sector and industry grew more or less rapidly than expected.

The statistical technique applied here is known as the "shift" technique. Huff (1967) has applied it to consumer market analysis, while Perloff, et al. (1960), Fuchs (1959) and Creamer (1943) have used it for industry location studies. The specific procedure can be explicated by reference to Table IV-5. (It is the same for Tables IV-6 and IV-7.) At the foot of the table are the values of the growth sectors (k) for the five age groups, each representing the intercensal change for the entire employed population. For example, for the 15-24 age group, the value is 1.391756, meaning that the number of persons aged 15-24 increased by 39% during the 1960-70 period. In contrast, the value for the 35-44 age group was .954030, a decrease of about 5% during the decade.

Examining the 15-24 age group for the Extractive sector, columns 1 and 2 give the numbers (the 1% sample figures) reported for 1960 and 1970. Column 3 is the actual 1960-1970 change while column 4, Expected Value 1970, is the product of the 1960 figures and the k value (8164 x 1.391756 = 11,362). Column 5 is the expected change 1960-1970 (11,362 - 8,164 = 3,198) had this age category changed exactly as did the total employed in the 15-24 age category. Column 6, the Net Shift, is simply the subtraction of the actual from the expected. In this case it totals -6,133 because of the negative sign for the actual change.

Table IV-5

NET SHIFTS OF AGE GROUPS OF THE TOTAL LABOR FORCE BY SECTOR AND INDUSTRY, 1960-1970

Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
EXTRACTIVE								
15-24	8164	5229	-2935	11,362	3198	-6133	-12.2	-75.1
25-34	8461	5253	-3208	9357	896	-4104	- 8.2	-48.5
35-44	10,477	6037	-4440	9995	-482	-3958	- 7.9	-37.8
45-54	11,148	7006	-4142	12,407	1259	-5401	-10.8	-48.4
55-64	8439	6209	-2230	9841	1402	-3632	- 7.2	-43.0
Agric., forestry, fishing								
15-24	7493	4498	-2995	10,428	2935	-5930	-11.8	-79.1
25-34	6849	3916	-2933	7574	725	-3658	- 7.3	-53.4
35-44	8658	4650	-4008	8260	-398	-3610	- 7.2	-41.7
45-54	9554	5514	-4040	10,633	1079	-5119	-10.2	-53.6
55-64	7558	5295	-2263	8814	1256	-3519	- 7.0	-46.6
Mining								
15-24	671	731	60	934	263	-203	- .4	-30.3
25-34	1612	1337	-275	1783	171	-446	- .9	-27.7
35-44	1819	1387	-432	1735	- 84	-348	- .7	-19.1
45-54	1594	1492	-102	1774	180	-282	- .6	-17.7
55-64	881	914	33	1027	146	-113	- .2	-12.8
TRANSFORMATIVE								
15-24	31,603	38,549	6946	43,984	12,381	-5435	-10.8	-17.2
25-34	53,466	54.500	1034	59,125	5659	-4625	- 9.2	- 8.7
35-44	60,499	53,423	-7076	57,718	-2781	-4295	- 8.6	- 7.1
45-54	48,559	53,522	4963	54,041	5482	-519	- 1.0	- 1.1
55-64	28,070	32,885	4815	32,735	4665	150	.3	.5
Construction								
15-24	4766	5670	904	6633	1867	-963	- 1.9	-20.2
25-34	9192	9410	218	10,165	973	-755	- 1.5	- 8.2
35-44	10,453	9737	-716	9973	-480	-236	- .5	- 2.3
45-54	8485	9269	784	9443	958	-174	- .3	- 2.0
55-64	5369	5996	627	6261	892	-265	- .5	- 4.9

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1360-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Food								
15-24	2826	2401	- 425	3933	1107	-1532	- 3.0	-54.2
25-34	4550	3165	-1385	5032	482	-1867	- 3.7	-41.0
35-44	5093	3227	-1866	4859	-234	-1632	- 3.3	-32.0
45-54	4245	3266	- 979	4724	479	-1458	- 2.9	-34.3
55-64	2426	2190	- 236	2829	403	- 639	- 1.3	-26.3
Textiles								
15-24	3230	3793	563	4496	1266	- 703	- 1.4	-21.8
25-34	4383	4297	- 86	4847	464	- 550	- 1.1	-12.5
35-44	5687	4530	-1157	5426	- 261	- 896	- 1.8	-15.8
45-54	5216	4951	- 265	5805	589	- 854	- 1.7	-16.4
55-64	2819	3420	601	3287	468	133	- .3	4.7
Metal								
15-24	2722	3432	710	3788	1066	- 356	- .7	-13.1
25-34	5496	5136	- 360	6078	582	- 942	- 1.9	-17.1
35-44	6486	5304	-1182	6188	- 298	- 884	- 1.8	-13.6
45-54	4984	5830	846	5547	563	283	.6	5.7
55-64	2830	3571	741	3300	470	271	.5	9.6
Machinery								
15-24	6334	9604	3270	8816	2482	788	1.6	12.4
25-34	12,974	15,125	2151	14,347	1373	- 778	1.6	6.0
35-44	14,6[illegible]0	13,576	-1054	13,957	- 673	- 381	- .8	- 2.6
45-54	10,[illegible]82	13,565	3083	11,665	1183	1900	3.8	18.1
55-64	5720	7183	1463	6671	951	512	1.0	9.0
Chemical								
15-24	1249	1716	467	1738	489	- 22	-	- 1.8
25-34	3070	2859	- 211	3395	325	- 536	- 1.1	-17.5
35-44	3389	2753	- 636	3233	- 156	- 480	- 1.0	-14.2
45-54	2619	2784	165	2915	296	- 131	- .3	- 5.0
55-64	1363	1534	171	1590	227	- 56	- .1	- 4.1

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Sector & Industry	Labor Force 1960	1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Misc. manufacturing								
15-24	9409	10,620	1211	13,095	3686	-24[illegible]	- 4.9	-26.3
25-34	11,522	12,269	747	12,741	1219	- 672	.9	- 4.1
35-44	12,399	12,036	- 363	11,829	- 570	207	.4	1.7
45-54	10,610	11,541	931	11,808	1198	- 267	- .5	- 2.5
55-64	6053	7470	1417	7059	1006	411	.8	6.8
Utilities								
15-24	1067	1313	246	1485	418	- 172	- .3	-16.1
25-34	2279	2239	- 40	2520	241	- 281	- .6	-12.3
35-44	2362	2260	- 102	2253	- 109	7	-	.3
45-54		2316	398	2134	216	182	.4	9.5
55-64	1490	1521	31	1738	248	- 217	- .4	-14.6
DISTRIBUTIVE								
15-24	25,384	36,863	11,479	35,329	9945	1534	3.1	6.0
25-34	28,442	30,760	2318	31,453	3011	- 693	-1.4	- 2.4
35-44	33,325	31,776	-1549	31,793	-1532	- 17	-	- .1
45-54	29,348	32,783	3435	32,661	3313	122	.2	.4
55-64	18,610	21,771	3161	21,702	3092	69	.1	.4
Transportation								
15-24	2676	3599	923	3725	1049	- 126	- .3	- 4.7
25-34	6081	6226	145	6725	644	- 499	-1.0	- 8.2
35-44	7462	6377	-1085	7119	- 343	- 742	-1.5	- 9.9
45-54	6525	6675	150	7262	737	- 587	-1.2	- 9.0
55-64	4747	4321	- 426	5536	789	-1215	-2.4	-25.6
Communication								
15-24	1910	3134	1224	2656	748	476	.9	24.9
25-34	2586	2643	57	2860	274	- 217	- .4	- 8.4
35-44	1913	2459	546	1825	- 88	634	1.3	33.1
45-54	1271	1750	479	1414	143	336	.7	26.4
55-64	759	784	25	885	.26	-101	- .2	-13.3

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Wholesale Trade								
15-24	3186	4747	1561	4434	1248	313	.6	9.8
25-34	5263	6616	1353	5820	557	796	1.6	15.1
35-44	5912	6623	711	5640	- 272	983	2.0	16.6
45-54	4859	6502	1643	5407	548	1095	2.2	22.5
55-64	2934	4034	1100	3421	487	613	1.2	20.9
Retail Trade								
15-24	17,612	25,383	7771	24,512	6900	871	1.7	4.9
25-34	14,512	15,275	763	16,048	1536	- 773	-1.5	- 5.3
35-44	18,038	16,317	-1721	17,209	- 829	- 892	-1.8	- 4.9
45-54	16,693	17,856	1163	18,578	1885	- 722	-1.4	- 4.3
55-64	10,170	12,632	2462	11,860	1690	772	1.5	7.6
PRODUCER SERVICES								
15-24	7679	12,157	4478	10,687	3008	1470	2.9	19.1
25-34	9811	13,652	3841	10,849	1038	2803	5.6	28.6
35-44	9516	11,840	2324	9079	- 437	2761	5.5	29.0
45-54	8030	11,007	2977	8937	907	2070	4.1	25.8
55-64	5613	7185	1572	6546	933	639	1.3	11.4
Banking								
15-24	2734	4192	1458	3805	1071	387	.8	14.2
25-34	2605	3850	1245	2881	276	969	1.9	37.2
35-44	2059	2950	891	1964	- 95	986	2.0	47.9
45-54	1767	2386	619	1967	200	419	.8	23.7
55-64	1230	1624	394	1434	204	190	.4	15.4
Insurance								
15-24	2336	3014	678	3251	915	- 237	- .5	-10.1
25-34	2785	2920	135	3080	295	- 160	- .3	- 5.7
35-44	2581	2711	130	2462	- 119	249	.5	9.6
45-54	2083	2634	551	2318	235	316	.6	15.2
55-64	1203	1474	271	1403	200	71	.1	5.9

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Real Estate								
15-24	452	701	249	629	177	72	.1	15.9
25-34	824	1050	226	911	87	139	.3	16.9
35-44	1290	1411	121	1231	- 59	180	.4	14.0
45-54	1500	1902	402	1669	169	233	.5	15.5
55-64	1412	1549	137	1647	235	- 98	- .2	- 6.9
Engineering, Architecture								
15-24	293	499	206	408	115	91	.2	31.1
25-34	626	867	241	692	66	175	.3	28.0
35-44	527	724	197	503	- 24	221	.4	41.9
45-54	320	539	219	356	36	183	.4	57.2
55-64	201	331	130	234	33	97	.2	48.3
Accounting								
15-24	207	534	327	288	81	246	.5	118.8
25-34	426	804	378	471	45	333	.7	78.2
35-44	399	572	173	381	- 18	191	.4	47.9
45-54	289	458	169	322	33	136	.3	47.1
55-64	200	276	76	233	33	43	.1	21.5
Miscellaneous Business Services								
15-24	1304	2685	1381	1815	511	870	1.7	66.7
25-34	1916	3160	1244	2119	203	1041	2.1	54.3
35-44	1995	2703	708	1903	- 92	800	1.6	40.1
45-54	1465	2390	925	1830	165	760	1.5	51.9
55-64	943	1376	433	1100	157	276	.6	29.3
Legal								
15-24	353	532	179	491	138	41	.1	11.6
25-34	629	1001	372	695	66	306	.6	48.6
35-44	665	769	104	635	- 30	134	.3	20.2
45-54	606	698	92	675	69	23	-	3.8
55-64	424	555	131	495	71	60	.1	14.2

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
SOCIAL SERVICES								
15-24	14,372	28,679	14,307	20,002	5630	8677	17.3	60.4
25-34	22,126	33,489	11,363	24,468	2342	9021	18.0	40.8
35-44	25,505	32,902	7397	24,332	-1173	8570	17.1	33.6
45-54	23,587	33,575	9988	26,250	2663	7325	14.6	31.1
55-64	15,116	22,548	7432	17,628	2512	4920	9.8	32.5
Medical, Health								
15-24	1056	2771	1715	1470	414	1301	2.6	123.2
25-34	1621	2671	1050	1793	172	878	1.8	54.2
35-44	2348	3232	884	2240	- 108	992	2.0	42.2
45-54	2142	3468	1326	2384	242	1084	2.2	50.6
55-64	1479	2383	904	1725	246	658	1.3	44.5
Hospital								
15-24	3613	5964	2351	5028	1415	936	1.9	25.9
25-34	3986	5840	1854	4408	422	1432	2.9	35.9
35-44	3778	5206	1428	3604	- 174	1602	3.2	42.4
45-54	3539	5099	1560	3939	400	1160	2.3	32.8
55-64	2228	3655	1427	2598	370	1057	2.1	47.4
Education								
15-24	5634	12,989	7355	7841	2207	5148	10.3	91.4
25-34	7351	14,200	6849	8129	778	6071	12.1	82.6
35-44	7542	12,387	4845	7195	- 347	5192	10.4	68.8
45-54	8194	11,535	3341	9119	925	2416	4.8	29.5
55-64	5232	8380	3148	6102	870	2278	4.5	43.5
Welfare								
15-24	737	1274	537	1026	289	248	.5	33.6
25-34	1126	1626	500	1245	119	381	.8	33.8
35-44	1294	1731	437	1235	- 59	496	1.9	38.3
45-54	1333	1718	385	1483	150	235	.5	17.6
55-64	1168	1486	318	1362	194	124	.2	10.6

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Sector & Industry	Labor Force 1960	1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Nonprofit								
15-24	373	588	215	519	146	69	.1	18.5
25-34	440	540	100	486	46	54	.1	12.3
35-44	525	578	53	501	- 24	77	.2	14.7
45-54	577	662	85	642	65	20	-	3.5
55-64	407	516	109	475	68	41	.1	10.1
Postal								
15-24	375	743	368	522	147	221	.4	58.9
25-34	1160	1159	- 1	1283	123	- 124	- .2	-10.7
35-44	1829	1731	- 98	1745	- 84	- 14	-	- .8
45-54	1429	2216	787	1590	161	626	1.2	43.8
55-64	740	1082	342	863	123	219	.4	29.6
Government								
15-24	2465	4077	1612	3431	966	646	1.3	26.2
25-34	6168	6960	792	6821	653	139	.3	2.3
35-44	7865	7616	- 249	7503	- 362	113	.2	1.4
45-54	6182	8506	2324	6880	698	1626	3.2	26.3
55-64	3739	4816	1077	4360	621	456	.9	12.2
Miscellaneous Social & Professional								
15-24	119	273	154	165	46	108	.2	90.8
25-34	274	493	219	303	29	190	.4	69.3
35-44	324	421	97	309	- 15	112	.2	34.6
45-54	191	371	180	213	22	158	.3	82.7
55-64	123	230	107	143	20	87	.2	70.7
PERSONAL SERVICES								
15-24	13,473	18,638	5165	18,751	5278	- 113	- .2	- .8
25-34	12,430	11,344	-1086	13,746	1316	-2402	-4.8	-19.3
35-44	15,953	12,159	-3794	15,220	- 733	-3061	-6.1	-19.2
45-54	15,700	13,875	-1825	17,472	1772	-3597	-7.2	-22.9
55-64	11,149	10,856	- 295	13,002	1853	-2146	-4.3	-19.2

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Domestic								
15-24	3994	2331	-1663	5559	1565	-3228	-6.4	-80.8
25-34	2579	1133	-1446	2852	273	-1719	-3.4	-66.7
35-44	3514	1611	-1903	3353	- 161	-1742	-3.5	-49.6
45-54	4206	2449	-1757	4631	475	-2232	-4.5	-53.1
55-64	3642	2693	- 949	4247	605	-1554	-3.1	-42.7
Hotel								
15-24	876	1330	454	1219	343	111	.2	12.7
25-34	862	1102	240	953	91	149	.3	17.3
35-44	1245	1164	- 81	1188	- 57	- 24	-	- 1.9
45-54	1505	1403	- 102	1675	170	- 272	- .5	-18.1
55-64	1336	1270	- 66	1558	222	- 288	- .6	-21.6
Eating, Drinking								
15-24	3779	8439	4660	5259	1480	3180	6.3	84.1
25-34	3532	3571	39	3906	374	- 335	- .7	- 9.5
35-44	4462	4070	- 392	4257	- 205	- 187	- .4	- 4.2
45-54	4057	4095	38	4515	458	- 420	- .8	-10.4
55-64	2403	2623	220	2802	399	- 179	- .4	- 7.4
Repair								
15-24	1434	1883	449	1996	562	- 113	- .2	- 7.9
25-34	2031	2008	- 23	2246	215	- 238	- .5	-11.7
35-44	2204	1870	- 334	2103	- 101	- 233	- .5	-10.6
45-54	1813	1871	58	2017	204	- 146	- .3	- 8.1
55-64	1018	1204	186	1187	169	17	-	1.7
Laundry								
15-24	938	893	- 45	1306	368	- 413	- .8	-44.0
25-34	1182	766	- 416	1307	125	- 541	-1.1	-45.8
35-44	1649	1084	- 565	1573	- 76	- 489	-1.0	-29.7
45-54	1568	1373	- 195	1745	177	- 372	- .7	-23.7
55-64	930	1056	126	1085	155	- 29	- .1	- 3.1

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Barber								
15-24	761	1569	808	1059	298	510	1.0	67.0
25-34	1008	1424	416	1115	107	309	.6	30.7
35-44	1385	1103	- 282	1321	- 64	- 218	- .4	-15.7
45-54	1090	1240	150	1213	123	27	.1	2.5
55-64	669	786	117	780	111	6	-	.9
Entertainment								
15-24	1410	1861	451	1962	552	- 101	- .2	- 7.2
25-34	893	971	78	988	95	- 17	-	- 1.9
35-44	954	901	- 53	910	- 44	- 9	-	- .9
45-54	939	976	37	1045	106	- 69	- .1	- 7.3
55-64	719	820	101	839	120	- 19	-	- 2.6
Miscellaneous Personal Services								
15-24	281	332	51	391	110	- 59	- .1	-21.0
25-34	343	369	26	379	36	- 10	-	- 2.9
35-44	540	356	- 184	515	- 25	- 159	- .3	-29.4
45-54	522	468	- 54	581	59	- 113	- .2	-21.6
55-64	432	404	- 28	504	72	- 100	- .2	-23.1
TOTAL	614,055	690,472	76,417	690,472	76,417	±50,131	± 99.9	

$k_{15-24} = 1.391756$

$k_{25-34} = 1.105851$

$k_{35-44} = .954030$

$k_{45-54} = 1.112897$

$k_{55-64} = 1.166178$

Table IV-6

NET SHIFTS OF AGE GROUPS OF THE MALE LABOR FORCE BY SECTOR AND INDUSTRY, 1960-1970

Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
EXTRACTIVE								
15-24	7316	4557	-2759	9254	1938	-4697	-18.1	-64.2
25-34	7626	4701	-2925	7843	217	-3142	-12.1	-41.2
35-44	9331	5342	-3989	8428	- 903	-3086	-11.9	-33.1
45-54	9995	6325	-3670	10,520	525	-4195	-16.1	-42.0
55-64	7637	5724	-1913	8245	608	-2521	- 9.7	-33.0
Agric., forestry, fishing								
15-24	6735	3934	-2801	8519	1784	-4585	-17.6	-68.1
25-34	6128	3473	-2655	6302	174	-2829	-10.9	-46.2
35-44	7619	4047	-3572	6882	- 737	-2835	-10.9	-37.2
45-54	8473	4938	-3535	8918	445	-3980	-15.3	-47.0
55-64	6784	4856	-1928	7324	540	-2468	- 9.5	-36.4
Mining								
15-24	581	623	42	735	154	- 112	- .4	-19.3
25-34	1498	1228	- 270	1541	43	- 313	- 1.2	-20.9
35-44	1712	1295	- 417	1546	- 166	- 251	- 1.0	-14.7
45-54	1522	1387	- 135	1602	80	- 215	- .8	-14.1
55-64	853	868	15	921	68	- 53	- .2	- 6.2
TRANSFORMATIVE								
15-24	23,128	27,268	4140	29,253	6125	-1985	- 7.6	- 8.6
25-34	43,167	43,139	- 28	44,394	1227	-1255	- 4.8	- 2.9
35-44	46,845	41,009	-5836	42,313	-4532	-1304	- 5.0	- 2.8
45-54	37,643	40,383	2740	39,620	1977	763	2.9	2.0
55-64	22,856	25,666	2810	24,675	1819	991	3.8	4.3
Construction								
15-24	4402	5195	793	5568	1166	- 373	- 1.4	- 8.5
25-34	8770	8929	159	9019	249	- 90	- .3	- 1.0
35-44	9917	9182	- 735	8958	- 959	224	.9	2.3
45-54	7988	8744	756	8408	420	336	1.3	4.2
55-64	5120	5650	530	5528	408	122	.5	2.4

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Food								
15-24	2083	1714	- 369	2635	552	- 921	- 3.5	-44.2
25-34	3620	2461	-1159	3723	103	-1262	- 4.9	-34.9
35-44	3669	2365	-1304	3314	- 355	- 949	- 3.7	-25.9
45-54	3132	2340	- 792	3296	164	- 956	- 3.7	-30.5
55-64	1821	1613	- 208	1966	145	- 353	- 1.4	-19.4
Textiles								
15-24	1406	1473	67	1778	372	- 305	- 1.2	-21.7
25-34	1790	1626	- 164	1841	51	- 215	- .8	-12.0
35-44	2098	1499	- 599	1895	- 203	- 396	1.5	-18.9
45-54	1975	1609	- 366	2079	104	- 470	- 1.8	-23.8
55-64	1248	1310	62	1347	99	- 37	- .1	- 3.0
Metal								
15-24	2100	2780	680	2656	556	124	.5	5.9
25-34	4819	4468	- 351	4956	137	- 488	- 1.9	-10.1
35-44	5633	4535	-1098	5088	- 545	- 553	- 2.1	- 9.8
45-54	4381	5023	642	4611	230	412	1.6	9.4
55-64	2547	3189	642	2750	203	439	1.7	17.2
Machinery								
15-24	4503	6639	2136	5696	1193	943	3.6	20.9
25-34	10,647	12,270	1623	10,950	303	1320	5.1	12.4
35-44	11,554	10,673	- 881	10,436	-1118	237	.9	2.1
45-54	8435	10,395	1960	8878	443	1517	5.8	18.0
55-64	4967	5827	860	5362	395	465	1.8	9.4
Chemical								
15-24	787	1119	332	995	208	124	.5	15.8
25-34	2561	2331	- 230	2634	73	- 303	- 1.2	-11.8
35-44	2815	2217	- 598	2543	- 272	- 326	- 1.3	-11.6
45-54	2204	2251	47	2320	116	- 69	- .3	- 3.1
55-64	1165	1250	85	1258	93	- 8	-	- .7

Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Miscellaneous Manufacturing								
15-24	7126	7374	248	9013	1887	-1639	- 6.3	-23.0
25-34	8970	9075	105	9225	255	- 150	- .6	- 1.7
35-44	9064	8515	- 549	8187	- 877	328	1.3	3.6
45-54	7824	7982	158	8235	411	- 253	- 1.0	- 3.2
55-64	4629	5457	828	4997	368	460	1.8	9.9
Utilities								
15-24	721	974	253	912	191	62	.2	8.6
25-34	1990	1979	- 11	2046	56	- 67	- .3	- 3.4
35-44	2095	2023	- 72	1892	- 203	131	.5	6.3
45-54	1704	2039	335	1793	89	246	.9	14.4
55-64	1359	1370	11	1467	108	- 97	- .4	- 7.1
DISTRIBUTIVE SERVICES								
15-24	16,610	22,508	5898	21,009	4399	1499	5.8	9.0
25-34	21,428	22,414	986	22,037	609	377	1.5	1.8
35-44	23,351	21,280	-2071	21,092	-2259	188	.7	.8
45-54	19,928	21,096	1168	20,974	1046	122	.5	.6
55-64	13,271	14,263	992	14,327	1056	- 64	- .2	- .5
Transportation								
15-24	2078	2572	494	2628	550	- 56	- .2	- 2.7
25-34	5487	5249	- 238	5643	156	- 394	- 1.5	- 7.2
35-44	6796	5556	-1240	6139	- 657	- 583	- 2.2	- 8.6
45-54	5987	5931	- 56	6301	314	- 370	- 1.4	- 6.2
55-64	4404	3941	- 463	4754	350	- 813	- 3.1	-18.5
Communication								
15-24	517	1077	560	654	137	423	1.6	81.8
25-34	1490	1614	124	1532	42	82	.3	5.5
35-44	1126	1435	309	1017	- 109	418	1.6	37.1
45-54	589	992	403	620	31	372	1.4	63.2
55-64	398	399	1	430	32	- 31	- .1	- 7.8

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Wholesale								
15-24	2163	3114	951	2736	573	378	1.5	17.5
25-34	4297	5348	1051	4419	122	929	3.6	21.6
35-44	4729	5163	434	4271	- 458	892	3.4	18.9
45-54	3828	5021	1193	4029	201	992	3.8	25.9
55-64	2387	3160	773	2577	190	583	2.2	24.4
Retail								
15-24	11,852	15,745	3893	14,991	3139	754	2.9	6.4
25-34	10,154	10,203	49	10,443	289	- 240	- .9	- 2.4
35-44	10,700	9126	-1574	9665	-1035	- 539	-2.1	- 5.0
45-54	9524	9152	- 372	10,024	500	- 872	-3.4	- 9.2
55-64	6082	6763	681	6566	484	197	.8	3.2
PRODUCER SERVICES								
15-24	2458	4073	1615	3109	651	964	3.7	39.2
25-34	6248	8090	1842	6426	178	1664	6.4	26.6
35-44	5842	7002	1160	5277	- 565	1725	6.6	29.5
45-54	4966	6271	1305	5227	261	1044	4.0	21.0
55-64	3823	4422	599	4127	304	295	1.1	7.7
Banking								
15-24	690	1086	396	873	183	213	.8	30.9
25-34	1305	1924	619	1342	37	582	2.2	44.6
35-44	965	1362	397	872	- 93	490	1.9	50.8
45-54	948	1046	98	998	50	48	.2	5.1
55-64	807	918	111	871	64	47	.2	5.8
Insurance								
15-24	513	656	143	649	136	7	-	1.4
25-34	1793	1688	- 105	1844	51	- 156	- .6	- 8.7
35-44	1678	1695	17	1516	- 162	179	.7	10.7
45-54	1243	1547	304	1308	65	239	.9	19.2
55-64	779	833	54	841	62	- 8	-	- 1.0

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Real Estate								
15-24	220	351	131	278	58	73	.3	33.2
25-34	572	633	61	588	16	45	.2	7.9
35-44	815	841	26	736	-79	105	.4	12.9
45-54	985	1141	156	1037	52	104	.4	10.6
55-64	999	1009	10	1079	80	-70	-.3	-7.0
Engineer, Architecture								
15-24	204	376	172	258	54	118	.5	57.8
25-34	545	737	192	561	16	176	.7	32.3
35-44	449	620	171	406	-43	214	.8	47.7
45-54	267	455	188	281	14	174	.7	65.2
55-64	178	284	106	192	14	92	.4	51.7
Accounting								
15-24	110	275	165	139	29	136	.5	123.6
25-34	323	539	216	332	9	207	.8	64.1
35-44	269	318	49	243	-26	75	.3	27.9
45-54	198	252	54	208	10	44	.2	22.2
55-64	142	165	23	153	11	12	-	8.5
Miscellaneous Business Services								
15-24	676	1280	604	855	179	425	1.6	62.9
25-34	1313	2012	699	1351	38	661	2.5	50.3
35-44	1245	1681	436	1124	-121	557	2.1	44.7
45-54	932	1417	485	981	49	436	1.7	46.8
55-64	632	873	241	682	50	191	.7	30.2
Legal								
15-24	45	49	4	57	12	-8	-	-17.8
25-34	397	557	160	408	11	149	.6	37.5
35-44	421	485	64	380	-41	105	.4	24.9
45-54	393	413	20	414	21	-1	-	-.3
55-64	286	340	54	309	23	31	.1	10.8

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
SOCIAL SERVICES								
15-24	5,189	9,627	4438	6,563	1374	3064	11.8	59.0
25-34	12,298	15,633	3335	12,647	349	2986	11.5	24.3
35-44	13,278	15,266	1988	11,993	-1285	3273	12.6	24.6
45-54	10,715	14,972	4257	11,278	563	3694	14.2	34.5
55-64	7,071	9,823	2752	7,634	563	2189	8.4	31.0
Medical								
15-24	171	372	201	216	45	156	.6	91.2
25-34	637	739	102	655	18	84	.3	13.2
35-44	1094	1104	10	988	-106	116	.4	10.6
45-54	905	1149	244	953	48	196	.8	21.7
55-64	662	801	139	715	53	86	.3	13.0
Hospital								
15-24	716	1213	497	906	190	307	1.2	42.9
25-34	1248	1519	271	1284	36	235	.9	18.8
35-44	1055	1090	35	953	-102	137	.5	13.0
45-54	884	1120	236	930	46	190	.7	21.5
55-64	637	864	227	688	51	176	.7	27.6
Education								
15-24	2138	4736	2598	2704	566	2032	7.8	95.0
25-34	3669	6129	2460	3773	104	2356	9.1	64.2
35-44	2832	4708	1876	2558	-274	2150	8.3	75.9
45-54	2475	3712	1237	2605	130	1107	4.3	44.7
55-64	1768	2852	1084	1909	141	943	3.6	53.3
Welfare								
15-24	351	469	118	444	93	25	.1	7.1
25-34	720	792	72	740	20	52	.2	7.2
35-44	733	940	207	662	-71	278	1.1	37.9
45-54	712	717	5	749	37	-32	-.1	-4.5
55-64	577	706	129	623	46	83	.3	14.4

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Non Profit								
15-24	184	265	81	233	49	32	.1	17.4
25-34	235	290	55	242	7	48	.2	20.4
35-44	255	318	63	230	-25	88	.3	34.5
45-54	302	338	36	318	16	20	.1	6.6
55-64	250	290	40	270	20	20	.1	8.0
Postal								
15-24	336	505	169	425	89	80	.3	23.8
25-34	1058	870	-188	1088	30	-218	-.8	-20.6
35-44	1644	1431	-213	1485	-159	-54	-.2	-3.3
45-54	1206	1870	664	1269	63	601	2.3	49.8
55-64	585	871	286	631	46	240	.9	41.0
Government								
15-24	1231	1942	711	1557	326	385	1.5	31.3
25-34	4551	4980	429	4680	129	300	1.2	6.6
35-44	5444	5379	-65	4917	-527	462	1.8	8.5
45-54	4103	5823	1720	4319	216	1504	5.8	36.7
55-64	2516	3304	788	2716	200	588	2.3	23.4
Miscellaneous Professionals								
15-24	62	125	63	78	16	47	.2	75.8
25-34	180	314	134	185	5	129	.5	71.7
35-44	221	296	75	200	-21	96	.4	43.4
45-54	128	243	115	135	7	108	.4	84.4
55-64	76	135	59	82	6	53	.2	69.7
PERSONAL SERVICES								
15-24	5941	8669	2728	7514	1573	1155	4.4	19.4
25-34	5758	5292	-466	5922	164	-630	-2.4	-10.9
35-44	6464	5042	-1422	5838	-626	-796	-3.1	-12.3
45-54	6623	5543	-1080	6971	348	-1428	-5.5	-21.6
55-64	5000	4508	-492	5398	398	-890	-3.4	-17.8

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Sector & Industry	Labor Force 1960	1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Domestic								
15-24	736	398	-338	931	195	-533	-2.1	-72.4
25-34	307	76	-231	316	9	-240		-78.2
35-44	322	105	-217	291	-31	-186	-.7	-57.8
45-54	459	174	-285	483	24	-309	-1.2	-67.3
55-64	447	208	-239	483	36	-275	-1.1	-61.5
Hotel								
15-24	504	626	122	637	133	-11	-	-2.2
25-34	398	427	29	409	11	18	.1	4.5
35-44	528	402	-126	477	-51	-75	-.3	-14.2
45-54	664	533	-131	699	35	-166	-.6	-25.0
55-64	683	536	-147	737	54	-201	-.8	-29.4
Eating, Drinking								
15-24	1607	4029	2422	2033	426	1996	7.7	124.2
25-34	1301	1309	8	1338	37	-29	-.1	-2.2
35-44	1596	1348	-248	1441	-155	-93	-.4	-5.8
45-54	1775	1430	-345	1868	93	-438	-1.7	-24.7
55-64	1278	1077	-201	1380	102	-303	-1.2	-23.7
Repair								
15-24	1292	1661	369	1634	342	27	.1	2.1
25-34	1894	1815	-79	1948	54	-133	-.5	-7.0
35-44	2026	1654	-372	1830	-196	-176	-.7	-8.7
45-54	1671	1640	-31	1759	88	-119	-.5	-7.1
55-64	943	1062	119	1018	75	44	.2	4.7
Laundry								
15-24	425	342	-83	538	113	-196	-.8	-46.1
25-34	557	328	-229	573	16	-245	-.9	-44.0
35-44	663	386	-277	599	-64	-213	-.8	-32.1
45-54	608	535	-73	640	32	-105	-.4	-17.3
55-64	442	419	-23	477	35	58	-.2	-13.1

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Sector & Industry	Labor Force 1960	1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Barber								
15-24	238	212	-26	301	63	-89	-.3	-37.4
25-34	473	509	36	487	14	22	.1	4.7
35-44	391	397	6	353	-38	44	.2	11.3
45-54	511	378	-133	538	27	-160	-.6	-31.3
55-64	442	368	-74	477	35	-109	-.4	-24.7
Entertainment								
15-24	956	1208	252	1209	253	-1	-	-.1
25-34	573	598	25	589	16	9	-	1.6
35-44	582	533	-49	526	-56	7	-	1.2
45-54	653	599	-54	687	34	-88	-.3	-13.5
55-64	530	609	79	572	42	37	.1	7.0
Miscellaneous Personal Services								
15-24	183	193	10	231	48	-38	-.1	-20.8
25-34	255	230	-25	262	7	-32	-.1	-17.5
35-44	356	217	-139	321	-35	-104	-.4	-29.2
45-54	282	254	-28	297	15	-43	-.2	-15.2
55-64	235	229	-6	254	19	-25	-.1	-10.6
TOTAL	411,806	429.908	18,102	429,908	18,102	±25,993	±99.9	

k_{15-24} = 1.264833

k_{25-34} = 1.028428

k_{35-44} = .903245

k_{45-54} = 1.052520

k_{55-64} = 1.079587

Table IV-7

NET SHIFTS OF THE TOTAL FEMALE LABOR FORCE BY SECTOR AND INDUSTRY, 1960-1970

Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
EXTRACTIVE								
15-24	848	672	-176	1343	495	-671	-2.9	-79.1
25-34	835	552	-283	1087	252	-535	-2.3	-64.1
35-44	1146	695	-451	1215	69	-520	-2.3	-45.4
45-54	1153	681	-472	1418	265	-737	-3.2	-63.9
55-64	802	485	-317	1087	285	-602	-2.6	-75.1
Agric., forestry, fishing								
15-24	758	564	-194	1201	443	-637	-2.8	-84.0
25-34	721	443	-278	938	217	-495	-2.2	-68.7
35-44	1039	603	-436	1102	63	-499	-2.2	-48.0
45-54	1081	576	-505	1329	248	-753	-3.3	-69.7
55-64	774	439	-335	1049	275	-610	-2.7	-78.8
Mining								
15-24	90	108	18	142	52	-34	- .1	-37.8
25-34	114	109	-5	149	35	-40	- .2	-35.1
35-44	107	92	-15	113	6	-21	- .1	-19.6
45-54	72	105	33	89	17	16	.1	22.2
55-64	28	46	18	38	10	8	--	28.6
TRANSFORMATIVE								
15-24	8475	11,281	2806	13,425	4950	-2144	-9.3	-25.3
25-34	10,299	11,361	1062	13,403	3104	-2042	-8.9	-19.8
35-44	13,654	12.414	-1240	14,479	825	-2065	-9.0	-15.1
45-54	10,916	13,139	2223	13,422	2506	-283	-1.2	-2.6
55-64	5214	7219	2005	7065	1851	154	.7	3.0
Construction								
15-24	364	475	111	577	213	-102	- .4	-28.0
25-34	422	481	59	549	127	-68	- .3	-16.1
35-44	536	555	19	568	32	-13	- .1	-2.4
45-54	497	525	28	611	114	-86	- .4	-17.3
55-64	249	346	97	337	88	9	--	3.6

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Sector and Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Food								
15-24	743	687	-56	1177	434	-490	-2.1	-65.9
25-34	930	704	-226	1210	280	-506	-2.2	-54.4
35-44	1424	862	-562	1510	86	-648	-2.8	-45.5
45-54	1113	926	-187	1369	256	-443	-1.9	-39.8
55-64	605	577	-28	820	215	-243	-1.1	-40.2
Textiles								
15-24	1824	2320	496	2889	1065	-569	-2.5	-31.2
25-34	2593	2671	78	3375	782	-704	-3.1	-27.2
35-44	3589	3031	-558	3806	217	-775	-3.4	-21.6
45-54	3241	3342	101	3985	744	-643	-2.8	-19.8
55-64	1571	2110	539	2129	558	-19	- .1	-1.2
Metal								
15-24	622	652	30	985	363	-333	-1.4	-53.5
25-34	677	668	-9	881	204	-213	- .9	-31.5
35-44	853	769	-84	904	51	-135	- .6	-15.8
45-54	603	807	204	741	138	66	.3	10.9
55-64	283	382	99	383	100	-1	--	-.4
Machinery								
15-24	1831	2965	1134	2901	1070	64	.3	3.5
25-34	2327	2855	528	3029	702	-174	-.8	-7.5
35-44	3076	2903	-173	3262	186	-359	-1.6	-11.7
45-54	2047	3170	1123	2517	470	653	2.8	31.9
55-64	753	1356	603	1020	267	336	1.5	44.6
Chemical								
15-24	462	597	135	732	270	-135	- .6	-29.2
25-34	509	528	19	662	153	-134	- .6	-26.3
35-44	574	536	-38	609	35	- 73	- .3	-12.7
45-54	415	533	118	510	95	23	.1	5.5
55-64	198	284	86	268	70	16	.1	8.0

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Misc. Mfg.								
15-24	2283	3246	963	3616	1333	-370	-1.6	-16.2
25-34	2552	3194	642	3321	769	-127	- .6	-5.0
35-44	3335	3521	186	3537	202	-16	- .1	- .5
45-54	2786	3559	773	3426	640	133	.6	4.8
55-64	1424	2013	589	1930	306	83	.4	5.8
Utilities								
15-24	346	339	-7	548	202	-209	- .9	-60.4
25-34	289	260	-29	376	87	-116	- .5	-40.1
35-44	267	237	-30	283	16	-46	- .2	-17.2
45-54	214	277	63	263	49	14	.1	6.5
55-64	131	151	20	178	47	-27	- .1	-20.6
DISTRIBUTIVE								
15-24	8774	14,355	5581	13,898	5124	457	2.0	5.2
25-34	7014	8346	1332	9128	2114	-782	-3.4	-11.1
35-44	9974	10,496	522	10,577	603	-81	- .4	- .8
45-54	9420	11,687	2267	11,583	2163	104	.5	1.1
55-64	5339	7508	2169	7235	1896	273	1.2	5.1
Transportation								
15-24	598	1027	429	947	349	80	.3	13.4
25-34	594	977	383	773	179	204	.9	34.3
35-44	666	821	155	706	40	115	.5	17.3
45-54	538	744	206	662	124	82	.4	15.2
55-64	343	380	37	465	122	-85	-.4	-24.8
Communication								
15-24	1393	2057	664	2207	814	-150	- .7	-10.8
25-34	1096	1029	-67	1426	330	-397	-1.7	-36.2
35-44	787	1024	237	835	48	189	.8	24.0
45-54	682	758	76	838	156	-80	- .3	-11.7
55-64	361	385	24	489	128	-104	- .5	-28.8

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Sector and Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Wholesale								
15-24	1023	1633	610	1620	597	13	.1	1.3
25-34	966	1268	302	1257	291	11	--	1.1
35-44	1183	1460	277	1254	71	206	.9	17.4
45-54	1031	1481	450	1268	237	213	.9	20.7
55-64	547	874	327	741	194	133	.6	24.3
Retail								
15-24	5760	9638	3878	9124	3364	514	2.2	8.9
25-34	4358	5072	714	5672	1314	-600	-2.6	-13.8
35-44	7338	7191	-147	7782	444	-591	-2.6	-8.1
45-54	7169	8704	1535	8815	1646	-111	- .5	-1.5
55-64	4088	5869	1781	5540	1452	329	1.4	8.0
PRODUCER SERVICES								
15-24	5221	8084	2863	8270	3049	-186	- .8	-3.6
25-34	3563	5562	1999	4637	1074	925	4.0	26.0
35-44	3674	4838	1164	3896	222	942	4.1	25.6
45-54	3064	4736	1672	3767	703	969	4.2	31.6
55-64	1790	2763	973	2426	636	337	1.5	18.8
Bank								
15-24	2044	3106	1062	3238	1194	-132	- .6	-6.5
25-34	1300	1926	626	1692	392	234	1.0	18.0
35-44	1094	1588	494	1160	66	428	1.9	39.1
45-54	819	1340	521	1007	188	333	1.4	40.7
55-64	423	706	283	573	150	133	.6	31.4
Insurance								
15-24	1823	2358	535	2888	1065	-530	-2.3	-29.1
25-34	992	1232	240	1291	299	-59	- .3	-5.9
35-44	903	1016	113	957	54	59	.3	6.5
45-54	840	1087	247	1033	193	54	.2	6.4
55-64	424	641	217	575	151	66	.3	15.6

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Real Estate								
15-24	232	350	118	367	135	-17	- .1	-7.3
25-34	252	417	165	328	76	89	.4	35.3
35-44	475	570	95	504	29	66	.3	13.9
45-54	515	761	245	633	118	128	.6	24.9
55-64	413	540	127	560	147	-20	- .1	-4.8
Engineer., Arch.								
15-24	89	123	34	141	52	-18	- .1	-20.2
25-34	81	130	49	105	24	25	.1	30.9
35-44	78	104	26	83	5	21	.1	26.9
45-54	53	84	31	65	12	19	.1	35.8
55-64	23	47	24	31	8	16	.1	69.6
Accounting								
15-24	97	259	162	153	56	106	.5	109.3
25-34	103	265	162	134	31	131	.6	127.2
35-44	130	254	124	138	8	116	.5	89.2
45-54	91	206	115	112	21	94	.4	103.3
55-64	58	111	53	79	21	32	.1	55.2
Misc. Business Serv.								
15-24	628	1405	777	995	367	410	1.8	65.3
25-34	603	1148	545	785	182	363	1.6	60.2
35-44	750	1022	272	795	45	227	1.0	30.3
45-54	533	973	440	655	122	318	1.4	59.7
55-64	311	503	192	421	110	82	.4	26.4
Legal								
15-24	308	483	175	488	180	-5	1.6	--
25-34	232	444	212	302	70	142	.6	61.2
35-44	244	284	40	259	15	25	.1	10.2
45-54	213	285	72	262	49	23	.1	10.8
55-64	138	215	77	187	49	28	.1	20.3

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
SOCIAL SERVICES								
15-24	9183	19,052	9869	14,546	5363	4506	19.6	49.1
25-34	9828	17,856	8028	12,791	2963	5065	22.0	51.5
35-44	12,227	17,636	5409	12,966	739	4670	20.3	38.2
45-54	12,872	18,603	5731	15,827	2955	2776	12.1	21.6
55-64	8045	12,725	4680	10,902	2857	1823	7.9	22.7
Medical Health								
15-24	885	2399	1514	1402	517	997	4.3	112.7
25-34	984	1932	948	1281	297	651	2.8	66.2
35-44	1254	2128	874	1330	76	798	3.5	63.6
45-54	1237	2319	1082	1521	284	798	3.5	64.5
55-64	817	1582	765	1107	290	475	2.1	58.1
Hospital								
15-24	2897	4751	1854	4589	1692	162	.7	5.6
25-341	2738	4321	1583	3563	825	758	3.3	27.7
35-44	2723	4116	1393	2888	165	1228	5.3	45.1
45-54	2655	3979	1324	3265	610	714	3.1	26.9
55-64	1591	2791	1200	2156	565	635	2.8	39.9
Education								
15-24	3496	8253	4757	5538	2042	2715	11.8	77.7
25-34	3682	8071	4389	4792	1110	3279	14.3	89.1
35-44	4710	7679	2969	4995	285	2684	11.7	57.0
45-54	5719	7823	2104	7032	1313	791	3.4	13.8
55-64	3464	5528	2064	4694	1230	834	3.6	24.1
Welfare								
15-24	386	805	419	611	225	194	.8	50.3
25-34	406	834	428	528	122	306	1.3	75.4
35-44	561	791	230	595	34	196	.9	34.9
45-54	621	1001	380	764	143	237	1.0	38.2
55-64	591	780	189	801	210	-21	- .1	-3.6

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Nonprofit								
15-24	189	323	134	299	110	24	.1	12.7
25-34	205	250	45	267	62	-17	- .1	-8.3
35-44	270	260	-10	286	16	-26	- .1	-9.6
45-54	275	324	49	338	63	-14	- .1	-5.1
55-64	157	226	69	213	56	13	.1	8.3
Postal								
15-24	39	238	199	62	23	176	.8	451.3
25-34	102	289	187	133	31	156	.7	152.9
35-44	185	300	115	196	11	104	.5	56.2
45-54	223	346	123	274	51	72	.3	32.3
55-64	155	211	56	210	55	1	--	.6
Government								
15-24	1234	2135	901	1955	721	180	.8	14.6
25-34	1617	1980	363	2105	488	-125	- .5	-7.7
35-44	2421	2237	-184	2567	146	-330	-1.4	-13.6
45-54	2079	2683	604	2556	477	127	.6	6.1
55-64	1223	1512	289	1657	434	-145	- .6	-11.9
Misc. Soc. and Prof.								
15-24	57	148	91	90	33	58	.3	101.8
25-34	94	179	85	122	28	57	.2	60.6
35-44	103	125	22	109	6	16	.1	15.5
45-54	63	128	65	77	14	51	.2	81.0
55-64	47	95	48	64	17	31	.1	66.0
PERSONAL SERVICES								
15-24	7532	9969	2437	11,931	4399	-1962	-8.5	-26.0
25-34	6672	6052	-620	8683	2011	-2631	-11.4	-39.4
35-44	9489	7117	-2372	10,065	574	-2946	-12.8	-31.0
45-54	9077	8332	-745	11,161	2084	-2829	-12.3	-31.2
55-64	6149	6348	199	8333	2184	-1985	-8.6	-32.3

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Domestic								
15-24	3258	1933	-1325	5161	1903	-3228	-14.0	-99.1
25-34	2272	1057	-1215	2957	685	-1900	-8.3	-83.6
35-44	3192	1506	-1686	3385	193	-1879	-8.2	-58.9
45-54	3747	2275	-1472	4607	860	-2332	-10.1	-62.2
55-64	3195	2485	-710	4330	1135	-1845	-8.0	-57.7
Hotel								
15-24	372	704	332	589	217	115	.5	30.9
25-34	464	675	211	604	140	71	.3	15.3
35-44	717	762	45	760	43	2	--	.3
45-54	841	870	29	1034	193	-164	- .7	-19.5
55-64	653	734	81	885	232	-151	- .7	-23.1
Eating, Drinking								
15-24	2172	4410	2238	3441	1269	969	4.2	44.6
25-34	2231	2262	31	2904	673	-642	-2.8	-28.8
35-44	2866	2722	-144	3039	173	-317	-1.4	-11.1
45-54	2282	2665	383	2806	524	-141	- .6	- 6.2
55-64	1125	1546	421	1524	399	22	.1	2.0
Repair								
15-24	142	222	80	225	83	-3	--	-2.1
25-34	137	193	56	178	41	15	.1	10.9
35-44	178	216	38	189	11	27	.1	15.2
45-54	142	231	89	175	33	56	.2	39.4
55-64	75	142	67	102	27	40	.2	53.3
Laundry								
15-24	513	551	38	813	300	-262	-1.1	-51.1
25-34	625	438	-187	813	188	-375	-1.6	-60.0
35-44	986	698	-288	1046	60	-348	-1.5	-35.3
45-54	960	838	-122	1180	220	-342	-1.5	-35.6
55-64	488	637	149	661	173	-24	- .1	-4.9

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Sector & Industry	Labor Force 1960	Labor Force 1970	Actual Change 1960-70	Expected Value 1970	Expected Change 1960-70	Net Shift	Percentage Net Shift	Net Shift as Percentage of 1960 Size
Barber								
15-24	523	1357	834	828	305	529	2.3	101.1
25-34	535	915	380	696	161	219	1.0	40.9
35-44	994	706	-288	1054	60	-348	-1.5	-35.0
45-54	579	862	283	712	133	150	.7	25.9
55-64	227	418	191	308	81	110	.5	48.5
Entertainment								
15-24	454	653	199	719	265	-66	-.3	-14.5
25-34	320	373	53	416	96	-43	-.2	-13.4
35-44	372	368	-4	395	23	-27	-.1	-7.3
45-54	286	377	91	352	66	25	.1	8.7
55-64	189	211	22	256	67	-45	-.2	-23.8
Misc. Personal Serv.								
15-24	98	139	41	155	57	-16	-.1	-16.3
25-34	88	139	51	115	27	24	.1	27.3
35-44	184	139	-45	195	11	-56	-.2	-30.4
45-54	240	214	-26	295	55	-81	-.4	-33.8
55-64	197	175	-22	267	70	-92	-.4	-46.7
TOTALS	202,249	260,564	58,315	260,564	58,315	23,001	±100.0	

k 15-24 = 1.584018

k 25-34 = 1.301432

k 35-44 = 1.060442

k 45-54 = 1.229582

k 55-64 = 1.355134

The last two columns of Table IV-5 are introduced as aids to interpretation. The Percentage Net Shift column indicates the relative importance of each of the age categories in each of the sectors and industries for the total population. Thus, continuing with the 15-24 Extractive sector age group, the -12.2 means that nearly one-eighth of all negative change by sectors is found in this one age category (6,133 ÷ 50,131 = 12.2). Since we are dealing with net shifts, the totals should add up to ± 100.0 (actually ±99.9 in this case because of rounding error.)

Whereas the net shift column reflects the importance of any one age category for the total employed labor force, the last column indicates the importance of the net shift for each age category in a given sector or industry. Thus, -75.1 means that the net shift (-6133) was three-quarters of the 1960 figure (8164). This is one of the largest differences in the entire table, but it is possible for the figure to be almost 0 (e.g., 0.5 for Transformative, 55-64). Columns 7 and 8 show great differences between them in magnitude because the bases of sectors and industries are so different.

Having explicated the procedures involved in the shift technique by reference to Table IV-5, let us state the case in general rather than specific terms. The shift analysis separates the actual change into two components: the expected change and the net shift. The expected change within sectors is the application of the growth rate of all persons in the age category to the actual 1960 sector and industry figures. This growth rate of the age category reflects many factors -- changes in the total population, changes in age and sex specific participation rates, changes in age of entry and of retirement. Now the assumption of the expected change is that all such factors affect the groups equally within each sector and each industry. Thus, the expected change component of the actual change may be viewed as divorced from changes caused by intersectoral movements of members continuing in the labor force, as well as the differential patterns of the incorporation of entry cohorts into specific industries and sectors. These latter types of changes are reflected in the net shift component.

There is another way of looking at this point. Since age groups are distributed unequally across sectors in 1960 and since they increased at different rates over the 1960-1970 decade, the expected sectoral distribution of the labor force could be expected to differ from the 1960 sectoral distribution. Conceivably, this expected difference would account for the movement out of the Extractive and Transformative sectors and the movement into the services. Thus, it is possible that the sectoral transformation could occur solely or predominantly as the result of expected changes, i.e, changes in the size of age groups.

This possibility is examined in Table IV-8. The actual 1960 and 1970 sectoral distributions of the five age groups are shown, along with the expected 1970 distribution based on the differential growth of age groups. It is clearly evident that the expected changes alone do not yield a "transformation" pattern. The expected sectoral redistribution is so slight as to be insignificant. And the pattern of these slight changes are not as would be anticipated. If the employed labor force would have changed as "expected" between 1960 and 1970, there would have been a movement into Extractive and out of Social services, the two sectors that actually experienced the largest loss and gain, respectively.

Table IV-8

ACTUAL VERSUS EXPECTED CHANGES IN THE SECTORAL DISTRIBUTION OF THE LABOR FORCE, AGES 15-64, FOR 1960 AND 1970

Industry Sector	Actual 1960 Distribution	Expected 1970 Distribution	Actual 1970 Distribution	% Point Difference 1970 Expected Minus 1960 Actual Dist.	% Point Difference 1970 Actual Minus 1960 Actual Dist.
Extractive	7.6	7.7	4.3	.1	-3.3
Transformative	36.2	35.9	33.7	- .3	-2.5
Distributive Svcs.	22.0	22.1	22.3	.1	.3
Producer Services	6.6	6.7	8.1	.1	1.5
Social Services	16.4	16.3	21.9	- .1	5.5
Personal Services	11.2	11.3	9.7	.1	-1.5
TOTALS	100.0	100.0	100.0		

Thus, it is evident that the much larger percentage point changes in the last column of Table IV-8 are due to sources other than changes in the size of age groups. In other words, it is due mainly to the new entry or re-entry patterns of members of the labor force and to the intersectoral shifts of existing labor force members as reflected by the net shift values.

The net shift figure reflects the portion of the actual change which was affected by "deviations" from the expected pattern of industry and sectoral participation. The deviations include the movements from one sector or industry to another by employed persons, or the entry or exit of greater or fewer number of persons than expected. Even more than the comparison of the situation in 1965 when compared to 1970 as provided in Chapter III, the shift approach is severely limited in what can be said about the origins of those entering or the destinations of those leaving particular sectors and industries. This is a familiar problem for those who must rely upon cross-sectional data. To make definitive statements about inter-industry mobility and its relation to age one needs longitudinal data such as that being accumulated in the Parnes study (1975).

What can we expect to get out of the shift share analysis? One lead is to link age structure to change of employment in a given industry. As we noted earlier in this report, the 1960's showed a slower growth of employment in the Transformative sector as compared with the total labor force. As a result, the share of total employment in this sector decreased from 35.9% in 1960 to 33.1% in 1970. The data in Table IV-5 show that four of the five age groups grew more slowly than could have been expected on the basis of the growth rates of these age groups in the total labor force. Only the oldest age group (55-64) expanded as expected.

The interesting finding of the differentiation by age is the fact that the youngest age group (15-24) showed the largest difference between actual and expected growth of employment. This suggests that with respect to the total labor force, relatively fewer new labor force entries find employment in the Transformative sector. (Whether this is by choice or not cannot be assessed with these data, but this point is not germane for our present purposes.)

The pattern demonstrated by the Transformative sector is, of course, constituted by the patterns of its eight industries. The one important exception to the sector pattern is machinery, which is also the single most important industry within the sector. This one industry accounts for 7.2 percent of the total positive net shift of the employed labor force and only the 35-44 age group expanded slightly less than expected.

The relationship for the proportionately decreasing industries to have less than expected growth in specific age categories holds in other sectors. It holds for agriculture and mining in Extractive, transportation in Distributive services, domestic service, repair, laundry and miscellaneous personal services in the Personal services sector. In each of these industries all age groups have negative net shifts. The consistency of patterns is not as strong for the proportionately increasing industries, where there are more cases of positive and negative net shifts within the same industries.

When one examines the age categories, the absolute numbers by category vary considerably. There is no regular progression, as would be the case in a life table, where each successive age group is smaller than the previous one. Nearly always (Personal Services being an exception), the 15-24 category is smaller than the 25-34 category, because many persons of this age have not entered the labor force, as is graphically indicated by the "notch" in the age-sex pyramids. At the other end, the oldest age category (with the one exception of domestic service) is smaller than the preceding category. But no such generalities can be made for the three intermediate age categories; they are distributed in many patterns.

At the sector level, the results are as anticipated. The Extractive sector has a heavy negative percentage net shift, accounting for nearly one-half (46.3%) of the total. Transformative has a negative total of 29.6%, and together with Extractive and Personal services (22.6%) it accounts for virtually all (98.5%) of the total negative shift. In the Transformative sector the youngest age category (15-24) is 17.2% less than expected. Within the sector, construction follows the overall pattern closely, but food and textiles both have large negative magnitudes for nearly all age categories. Whatever the reason, and it is probably linked to technological factors and changes in product demand, neither industry is able to attract its "share" of workers.

In Personal services, it is domestic service that has high negative figures for all age categories. Eating and drinking has an unusual pattern, for employment in the youngest age category expanded remarkably, the net shift being nearly as large (84.1%) as the total for 1960. The other age categories are all negative, but not nearly enough to offset the 15-24 category. Whether it is true that youth will be served, it is here evident that youth will serve, especially in the fast-food chains that have grown so rapidly since 1960.

Turning to the sectors and industries with net shifts greater than expected, it can be no surprise that Social services is the dominant sector, with more than three-quarters (76.8%) of the total positive net shift. It is particularly notable that all individual Social service industries expanded faster than expected (except for two age categories in postal services). Moreover, the majority of net shifts in the various age groups throughout the Social services is at least one-third of the 1960 employment in each specific category.

Examining the absolute figures for net shifts, we find nearly little difference in the three youngest age categories, and the drop-off to age 55-64 is not a sharp one. Education is numerically the largest industry within the sector, and above average growth was particularly important in the two youngest age groups. Government, the second largest industry within the sector, not only had less impressive growth but it was concentrated quite equally in the 15-24 and the 45-54 age groups, a most unusual pattern. The explanation for this is not known, but as we shall see, it is the consequence of the male distribution, since the female pattern is quite different.

Producer services is the other sector with more than expected growth. Its total positive net shift is 19.4%, with Social services accounting for all but 3.8% of the total positive net shift. By age group the distribution is relatively even, much more so than for Social services. The industries within the sectors show more variation (insurance has negative signs for the younger ages) but basically they conform to the overall pattern.

By contrast, one remaining sector, Distributive, has quite contradictory industry patterns that make the overall sector pattern of very little change a deceiving one. Transportation has all negative signs and retail trade three out of five, but they are quite small in their effects, none being in excess of 10% of the 1960 size, with the exception of the oldest category in transportation. Wholesale trade has a rather even pattern of positive net shifts by age, but the pattern for communication is a broken one.

Before attempting to draw conclusions about the total labor force, let us refer to the male and female distributions (Tables IV-6 and IV-7) for whatever light they can shed on the matter. Since males are 62% of the labor force in 1970 they tend to dominate, but the variation in female employment by sector is such that their impact can be considerable for particular sectors or industries. Moreover, females have higher growth rates (k values) for all age groups, and this translates into an absolute intercensal growth much greater than for males (5.8 versus 1.8 million). In the absolute distribution of individuals by sex for 1970, it is common for males to have the largest representation in the 25-34 age group, but this is not true for females because child bearing and child rearing tend to keep them out of the labor force at this time. Females are much more likely than males to have their peak representation in the 15-24 age group, especially in retail trade, Producers' and Personal services.

On the sector level, females have a strong negative pattern in the Extractive and Personal service sectors, the difference being that they are much less important in Extractive, but more important in Personal services. In the latter, whereas males had a 19.4% positive figure for the 15-24 age group, it is -26.0% for females. Within Personal services, the industries have similar patterns for males and females, with the most prominent exception being barber and beauty shops. For men there is a net negative shift but for women there is a strong positive relationship, especially in the youngest age category. The different technology and scheduling in barber shops compared to beauty shops has been well described by Wilburn (1969).

In the Transformative sector the actual growth of females in relation to the expected growth was much less as compared to males, with the effect somewhat stronger in the younger ages. Internally, the patterns are similar by sex, with machinery being the exception, having a positive net shift for both sexes.

The Social services are even more important for females than for males in providing for positive net shifts: 81.9% compared to 58.5%. Both sexes have greater than expected growth in all age groups. While young women were brought into the postal service in larger than expected numbers, their pattern of government is a mixed one, with an overall negative balance.

Producer services does not have as great an impact on the percentage net shift for females as for males, with the youngest age group having a slight negative shift. Perhaps the demand in banking and insurance in particular, is being met by the substitution of office machines for personnel. Miscellaneous business services, a hodge-podge of activities, shows strong growth for both sexes.

The disparate trends in Distributive, evident in the total figures, shows up as even more complicated when considered by sex. For example, transportation is negative in shift for males, but positive for females, save the oldest category. The reverse patterns are found in communication. Wholesaling is an important basis for shift shares for males, but it is of minor importance for females. The sign patterns for retail are similar for both sexes: positive for the youngest and oldest age groups and negative for the intermediate groups.

The shift approach allows us to consider once more the question of the relative importance of age groups in accounting for the sectoral transformation. The data of Table IV-9 was computed from the information provided in Tables IV-5, IV-6, IV-7 and is given for the total population, males and females in three panels. We examine first the upper panel on the total population.

The first column shows the actual sectoral changes in the percentage distribution of the total labor force from 1960 to 1970, and we see that the Extractive sector declined by 3.3 percentage points while Social services increased by 5.5 percentage points. Each of the other five columns by age shows the percentage point changes in the distribution that would have occurred if only one age group had changed as it actually did while the other four age groups had changed as expected, that is, had changed such that their 1970 distributions across sectors had remained the same as in 1960. Thus, the second column of Table IV-9 shows the change in the percentage distribution of the total labor force under the assumption that the actual 1960-1970 changes were experienced by only the youngest age group, the third column shows the changes that would have occurred if actual changes were experienced by only the 25-34 age group, etc.

The changes shown in each of columns 2-6 of Table IV-9 represent the differences between the actual 1960 percentage distribution and the expected 1970 distribution. The latter was computed directly from the "Number in Labor Force, 1970" and "Expected Value" columns of Table IV-5. For example, under the assumption that only the 15-24 age groups changed as expected, the 1970 distribution was calculated by: 1) summing, for each sector, the actual number in the 15-24 age group in 1970 and the expected 1970 employment values of the four older age groups, which yields an employment total for each sector; and 2) dividing each sectoral total by the total labor force in 1970, which gives the percentage of the labor force employed in each sector in 1970. This derived 1970 percentage distribution then was subtracted from the actual 1960 percentage distribution, resulting in a decline in the Extractive sector of the total labor force of .8 percentage points, a decline in the Transformative sector of 1.1 percentage points, an increase in the Distributive sector of .4 points, etc. (see panel 1 and column 2 of Table IV-9).

Columns 2 through 6 of the table enable us to compare the effects of the actual changes in each age group upon the sectoral distribution of the labor force. The results reinforce those obtained from the shift analysis. It can be seen that the youngest age group had the largest impact upon the declining Extractive and Transformative sectors, but a relatively small impact upon Producer services and the same magnitude of effect upon Social services as the 25-34 and 35-44 age groups. It is also evident that the three youngest age groups had substantially larger effects than did the two older age groups in only two sectors: Transformative and Social services. Definitely, the oldest age group had the least effect, yet even this age group contributed substantially to the decline in the Extractive sector and to the growth in Social services.

Table IV-9

CHANGES IN THE PERCENTAGE DISTRIBUTION OF THE TOTAL EMPLOYED LABOR FORCE, MALES AND FEMALES, AMONG SECTORS, UNDER THE ASSUMPTION OF ACTUAL CHANGES IN ONLY ONE AGE GROUP

Sector	Total Actual Change	Age Group Experiencing Actual Change				
		15-24	25-34	35-44	45-54	55-64
		Total Labor Force				
Extractive	-3.3	- .8	- .5	- .5	- .7	- .5
Transformative	-2.5	-1.1	-1.0	-1.0	- .4	- .3
Distributive	.3	.4	0	.1	.2	.2
Producer's Services	1.5	.3	.5	.5	.4	.2
Social Services	5.5	1.2	1.2	1.2	1.0	.6
Personal Services	-1.5	.1	- .2	- .3	- .4	- .2
		Male				
Extractive	-4.0	-1.0	- .6	- .6	- .9	- .5
Transformative	- .9	- .7	- .6	- .6	- .1	.0
Distributive	.6	.5	.2	.2	.2	.1
Producer's Services	1.2	.1	.3	.3	.2	0
Social Services	3.4	.6	.6	.6	.7	.4
Personal Services	- .4	.4	0	0	- .2	0
		Female				
Extractive	-1.2	- .3	- .2	- .2	- .3	- .3
Transformative	-2.7	-1.1	-1.1	-1.1	- .4	- .2
Distributive	.1	.3	- .2	.1	.2	.2
Producer's Services	1.4	.2	.6	.6	.6	.2
Social Services	7.2	1.7	1.9	1.7	1.0	.4
Personal Services	-4.7	- .7	-1.0	-1.1	-1.0	- .7

There are no remarkable differences in the effects of the five age groups upon the sectoral transformation. Moreover, a scrutiny of columns 2-6 with the first column makes it quite clear that no one age group by itself could have effected a pattern of sectoral shifts similar in magnitude to the actual shifts which occurred. These conclusions for the total employed labor force hold for male and female as well. The magnitudes, of course, differ by sex, but the patterns are similar so they need not be discussed in detail.

Conclusions

Because of the large amounts of data that have been put before the reader in this chapter, it is desirable to end with some general statements that may serve to underscore the importance we attach to the role of age in the transformative process. While here as elsewhere in this report a decade is a rather short interval to analyze in terms of structural change, age as a variable does demonstrate some rather clear patterns.

Sex differences by age are a prominent feature of this chapter, perhaps best appreciated through the medium of the age-sex pyramids. The remarkable growth of female employment during the sixties made this sex more volatile in change than the much more slowly growing males. To that extent, females are more "interesting" to analyze than males.

One of the features of the net shifts presented in Tables IV-5 through IV-7 is the fact that the signs for the five age groups within both sectors and industries go in the same direction, that is to say, they are either all positive or all negative. This holds for all sectors except Distributive. Transformative has a positive 0.3% shift for the 55-64 age group but all other groups are negative, so it is hardly an exception. On the industry level there are more exceptions, concentrated in the Transformative, Distributive and Personal services. This pattern of sign consistency could have been predicted for industries that either grew much less than expected (e.g. agriculture) or much more (e.g. education), but its general pervasiveness comes as something of a surprise.

Another feature of the net shift is the relatively narrow range that it displays as a percentage of the 1960 size. That is, the variation by age category generally is not extreme. If one age group is growing much more rapidly than expected then the others will also, and vice versa. For example, for all age groups the range in Extractive is from -37.8 to -75.1 and in Social services from 31.1 to 60.4. Again, there are exceptions to this generalization, but the pattern is undeniably present and it is not an obvious one. The variation in numbers in age groups and the differential growth of the age groups could have led us to predict a substantially different pattern, with great variation especially in the extreme age groups.

The proportion of the total positive net shift accounted for by Social services is remarkable; 76.8% for total, 58.5% for male and 81.9% for female. This last figure especially is impressive, since it must be remembered that the net shift procedure already controls for the increase in labor force participation of women during the 1960-1970 decade. The 81.9% is, therefore, in addition to the strong growth that took place as a result of the overall increase of the age groups.

What has become so apparent by now that it would hardly seem to bear repeating is the variation and diversity that the variable of age assumes by sectors and industries. What is important to emphasize is that there is nothing mechanical or indeed obvious about the ways through which age operates in the transformative process; it strikes us as a rather complex matter and by no means have the analytical possibilities inherent in the subject been exhausted. As we had reason to lament upon earlier, some of the most important questions cannot be handled adequately by recourse to census data. Only large-scale surveys -- large because they are needed to provide the necessary detail -- designed to obtain retrospective questions about labor force behavior, can be expected to provide satisfactory answers to questions about origins and destinations.

Chapter V

THE INTERRELATIONSHIP OF INDUSTRY AND OCCUPATION

If we are to understand how the process of labor force transformation takes place we need to have a theory of work allocation that can encompass the various dimensions of work position and how they are interrelated. We do not have such a theory at this time, partly because the inclination has been to consider each dimension separately and in isolation from the others.

Sociologists, for example, have long considered work almost exclusively from the perspective of occupation, which is used to develop hierarchies of social stratification and the forms of social mobility that occur within them. (See Boudon, 1973, for a recent survey of the field.) But rarely do sociologists attempt to incorporate industry position in the interpretation of social stratification and social mobility. Perhaps the most notable example of this point is the fact that Blau and Duncan (1967) in their very influential study, The American Occupational Structure, collected information on industry positions of the respondents as well as those of their fathers and fathers-in-law, but they almost completely ignored these data, using industry position only to make minor refinements in their occupational coding, but not as an analytical variable in its own right. Probably the main reason for the neglect of industry position in the study of occupational mobility is the fact that occupational positions can be ranked to form a hierarchical ladder of status (although there are evident difficulties with all such rankings). In contrast, industry positions do not lend themselves to the formation of a status hierarchy.

But industries and sectors do vary in the degree to which they have different occupational mixes; that is, in the varying proportions of high or low-status occupations they display. This means that the differential growth of industries and sectors will directly affect the total occupational distribution and consequently will affect the probabilities of social mobility for those in the labor force.

After all, industry position logically is prior to occupational position. We say logically prior because anyone in the labor force must simultaneously occupy an industry and an occupational position. But the reality of the creation of specific work positions is that specific enterprises are created within specific industries. Then, when enterprises are formed, someone within them must recruit individuals to occupy specific occupational positions. Of course, the availability of certain occupational skills constrains the kinds of industries that develop; doubtless, a number of oil-rich nations have the investment capital to start high-technology industries, but they do not necessarily have the trained manpower to operate them. Which brings us back to the initial point: industry and occupation are interrelated, and they should be analyzed as such.

Such a task in all of its ramifications is far greater than can be attempted here. It would be preferable to have data directly on the enterprises themselves, rather than to depend on our indirect approach which relies upon information on individuals occupying particular industry positions as designated by the Bureau of the Census. Of course, the occupational titles reported for individuals in the census may not accurately reflect their actual work activities. Moreover, even accepting the population data on industry and occupation, their full potential will not be exploited. Even though the three-digit census codes for industry and occupation provide information on hundreds of titles, the analysis reported here will be restricted to the six sectors and the 37 industries and just eleven occupational classes. Eventually, research in this area should make use of the full range of the two and three digit classification, but for the largely exploratory purposes of this chapter, the more gross categories must suffice. Parenthetically, Gibbs and Poston (1975) have demonstrated that division of labor measures, created from U.S. census industry and occupation categories, produce much the same results whether gross, intermediate or detailed classifications are used.

It also should be made clear at this point that the purpose of this chapter is not to seek a comprehensive explanation of why industry-occupational configurations assume the patterns they do. The answers to the questions that arise from such an endeavor would lead us directly into the "motor" of economic growth and development and a consideration of the demand-supply factors that influence the industry-occupational patterns and their change. This cannot be attempted here, at least in more than passing fashion. Our concern is with the allocation of labor itself and how it is transformed over time. This offers many challenging problems in its own right. It is assumed that sectors and industries have differing occupational requirements such that most industries will have occupational profiles (even using the gross occupational categories) that clearly differentiate them from other sectors and industries. More than this, it is also assumed that even for so short a period as the 1960-1970 decade there can be significant differences introduced into the industry-occupational structures.

Logically, there are four combinations of industry-occupational change:

Type 1. There is growth (positive or negative) in numbers, but no proportionate change in the industry-occupational configuration; the pattern therefore remaining the same.

Type 2. There is a change in the industry-occupational configuration (possible under conditions of positive, negative or no growth), but it is accountable for solely by shifts in the industry distribution, the occupational profiles within industries remaining unchanged. For the total labor force the occupational distribution must change but not within industries.

Type 3. The reverse of Type 2. The industries do not change, but the occupational distributions within the industries change.

Type 4. With or without the growth of the total labor force, both the industry and occupational configurations change.

As already intimated, it is Type 4 which is overwhelmingly encountered in both developed and developing countries. Possibly, under pre-industrial conditions Type 1 was approximated, where there was little economic development and slow population growth. Of course, Types 2 and 3 are stated in stringent terms and if they were restated to mean only that the predominant change was of the occupational structure within industries or of the industry structure itself, these patterns would be empirically more likely to be encountered.

In Table V-1 the occupational distribution for the total labor force for 1960 and 1970 is given for 11 categories. The only modification of the conventional one-digit classification is the division of professional into professional and semi-professional (see Appendix D for allocation). As is well known, farmers and farmer laborers declined by about 50%, operatives and laborers over 10%. In contrast, professionals and semi-professionals increased by over 25% and clerical by nearly 20%. The remaining occupational categories are more or less holding their own.

The configuration for the entire labor force is well known, but what should we expect for sectors and industries? Will they not have their own sets of "imperatives" that serve to mold their occupational distributions? The array of factors that can impinge upon these distributions -- i.e., the demand and supply of trained manpower, the investment decisions of private firms and of governments, the infusion of technology, the kinds of discrimination practiced against minorities and females -- is so large and varied that no attempt can be made to fully "explain" the patterns that can be detected. In any event, as noted in the introductory chapter, we are interested primarily in how the labor force changes rather than why it changes.

Tables V-2, 3 and 4 present the occupational distributions within the six sectors for 1960 and 1970 and both the percentage point difference and the percentage change for the 1960-70 period. (Rather than taxing the reader's eyesight and patience with comparable distributions for each of the 37 industries we will refer to industries only when they seem to offer a distinctive point.) The distributions and their changes are complex and cannot easily be summarized.

There is a greater concentration in a few occupational categories by sector than was true for the entire employed labor force. To no one's surprise, farmers and farm laborers together account for over two-thirds of employment in the Extractive sector. What does command our attention is the appreciable decline in this total between 1960 and 1970, something over 10 percentage points. Although the professional and semi-professional categories grew by only 2 percentage points, their percentage change was over 100% during the decade. In agriculture (mining has a different pattern) the growth of these two occupational categories may be said to represent a diffusion of expertise. In agriculture this means not only professional agronomists and engineers but also increases in managers, clerical and sales, all a sign of the developing agribusiness. The 1960-70 trend may be expected to continue.

No other sector has so great a concentration as does Extractive in just two categories, but Personal services, even in 1970, had nearly 60% (58.42) in service occupations. Transformative had -2.57 percentage point decline from 1960-1970 in the proportion who were craftsmen, operatives and laborers (68.41%

Table V- 1

OCCUPATIONAL DISTRIBUTION OF THE TOTAL LABOR FORCE, 1960-1970

Occupational Category	Percent in 1960	Percent in 1970	Percent Point Change	Percentage Change
Professional	8.01	10.20	2.19	27.3
Semi-Professional	3.80	4.79	.99	26.1
Farmers	4.08	1.85	-2.23	-54.7
Managers	8.76	8.50	- .26	- 3.0
Clerical	15.16	18.02	2.86	18.90
Sales	7.57	7.28	- .29	-3.80
Craftsmen	14.21	13.75	- .46	-3.20
Operatives	19.34	17.32	-2.02	-10.40
Service	11.73	12.68	.95	8.10
Laborers	5.03	4.40	- .63	-12.50
Farm Laborers	2.37	1.26	-1.11	-46.80

Table V-2

OCCUPATIONAL DISTRIBUTIONS WITHIN INDUSTRY SECTORS, 1960 AND 1970, BOTH SEXES
(In Percent)

	Extractive	Transformative	Distributive Services	Producer Services	Social Services	Personal Services
Professional						
1960	1.18	4.19	2.15	11.63	31.18	.45
1970	2.48	5.14	2.44	11.92	30.84	1.13
Semi-Professional						
1960	.97	3.08	.72	3.83	11.58	2.72
1970	1.90	4.02	1.43	5.83	10.65	2.43
Farmers						
1960	49.81	.00	.00	.00	.00	.00
1970	40.56	.00	.00	.00	.00	.00
Managers						
1960	1.26	6.01	16.65	14.57	5.07	9.43
1970	1.85	6.08	13.82	12.87	6.19	9.14
Clerical						
1960	1.67	11.13	18.49	41.11	22.64	4.97
1970	3.36	11.80	21.14	42.11	22.97	7.71
Sales						
1960	.26	3.14	23.74	16.20	.23	1.01
1970	.47	2.64	22.18	15.02	.28	1.43
Craftsmen						
1960	3.54	26.38	11.37	3.46	4.71	9.58
1970	5.91	26.70	12.36	2.98	3.23	9.59
Operatives						
1960	9.38	36.33	18.66	2.05	2.48	9.52
1970	9.31	35.32	17.57	2.02	1.79	7.58
Service						
1960	.42	1.50	2.79	5.90	20.48	59.35
1970	.78	1.94	2.80	6.25	22.87	58.42
Laborers						
1960	2.60	8.27	5.43	1.29	1.68	3.01
1970	5.91	6.39	6.31	1.03	1.23	2.62
Farm Laborers						
1960	28.96	.00	.00	.00	.00	.00
1970	27.54	.00	.00	.00	.00	.00
Total Sample Size						
1960	(51,469)	(228,407)	(140,844)	(43,186)	(106,033)	(73,902)
1970	(32,571)	(238,318)	(160,373)	(58,842)	(157,394)	(71,789)

Table V-2

(Continued)

PERCENT POINT CHANGE AND PERCENTAGE CHANGE OF OCCUPATIONAL CATEGORIES WITHIN INDUSTRY SECTORS, 1960--1970, BOTH SEXES

	Extractive	Transformative	Distributive Services	Producer Services	Social Services	Personal Services
Professional						
% Point Change	1.30	.95	.29	.29	- .34	.68
Percentage Change	110.17	22.67	13.49	2.49	-1.09	151.11
Semi-Professional						
% Point Change	.93	.94	.71	2.00	- .93	- .29
Percentage Change	95.88	30.52	98.61	52.22	-8.03	-10.66
Farmers						
% Point Change	-9.25	.00	.00	.00	.00	.00
Percentage Change	-18.57	---	---	---	---	---
Managers						
% Point Change	.59	.07	-2.83	-1.70	1.12	- .29
Percentage Change	46.82	1.16	-17.00	-11.67	22.09	-3.07
Clerical						
% Point Change	1.69	.67	2.65	1.00	.33	2.74
Percentage Change	101.20	6.02	14.33	2.43	1.46	55.13
Sales						
% Point Change	.21	- .50	-1.61	-1.18	.05	.42
Percentage Change	80.77	-15.92	-6.77	-7.28	21.74	41.58
Craftsmen						
% Point Change	2.37	.32	.99	- .48	-1.48	.01
Percentage Change	66.95	1.21	8.71	-13.87	-31.42	0.10
Operatives						
% Point Change	- .07	-1.01	-1.09	- .03	- .69	1.94
Percentage Change	- .75	-2.78	-5.84	-1.46	-27.82	20.38
Service						
% Point Change	.36	.44	.01	.35	2.39	.93
Percentage Change	85.71	29.33	.36	5.93	11.67	1.57
Laborers						
% Point Change	3.31	-1.88	.88	- .26	- .45	- .39
Percentage Change	127.31	-22.73	16.21	-20.16	-26.78	-12.96
Farm Laborers						
% Point Change	-1.42	.00	.00	.00	.00	.00
Percentage Change	-4.90	---	---	---	---	---

NOTE: Computed From Table

Table V-3

OCCUPATIONAL DISTRIBUTIONS WITHIN INDUSTRY SECTORS, 1960-1970, MALES (In Percent)

	Extractive	Transformative	Distributive Services	Producer Services	Social Services	Personal Services
Professional						
1960	1.25	5.01	2.68	18.13	25.14	.63
1970	2.56	6.27	3.16	19.17	28.47	1.30
Semi-Professional						
1960	1.00	3.43	.78	5.66	13.67	4.63
1970	1.87	4.48	1.60	8.25	13.10	4.05
Farmers						
1960	52.36	.00	.00	.00	.00	.00
1970	43.11	.00	.00	.00	.00	.00
Managers						
1960	1.32	7.18	20.53	20.61	7.69	16.31
1970	1.92	7.53	17.64	18.86	10.43	15.63
Clerical						
1960	.70	5.78	8.55	14.52	15.91	2.59
1970	1.10	5.83	8.38	13.75	13.36	3.38
Sales						
1960	.24	3.59	18.32	23.75	.28	1.37
1970	.39	3.19	17.61	22.35	.31	1.69
Craftsmen						
1960	3.86	32.51	15.51	5.55	9.53	22.03
1970	6.50	33.49	17.65	4.98	6.85	21.00
Operatives						
1960	9.95	30.91	24.01	2.80	3.83	11.71
1970	9.90	29.24	23.14	2.69	2.90	9.43
Service						
1960	.33	1.54	2.20	6.95	20.67	34.06
1970	.62	2.21	2.20	8.28	22.09	38.30
Laborers						
1960	2.77	10.10	7.46	2.08	3.33	6.72
1970	6.01	7.80	8.67	1.72	2.53	5.26
Farm Laborers						
1960	26.29	.00	.00	.00	.00	.00
1970	26.09	.00	.00	.00	.00	.00
Total Sample Size						
1960	(46,312)	(178,798)	(98,830)	(25,352)	(51,495)	(32,111)
1970	(29,296)	(181,676)	(105,950)	(32,074)	(68,326)	(31,244)

Table V-3

(Continued)

PERCENT POINT CHANGE AND PERCENTAGE CHANGE OCCUPATIONAL CATEGORIES WITHIN INDUSTRY SECTORS, 1960 AND 1970, MALES (In Percent)

	Extractive	Transformative	Distributive Services	Producer Services	Social Services	Personal Services
Professional						
% Point Change	1.31	1.26	.48	1.04	3.33	.67
Percentage Change	104.80	25.15	17.91	5.74	13.24	106.35
Semi-Professional						
% Point Change	.87	1.05	.82	2.59	- .57	- .58
Percentage Change	87.00	30.61	105.13	45.76	-4.17	-12.53
Farmers						
% Point Change	- 9.25	.00	.00	.00	.00	.00
Percentage Change	-17.66	----	----	----	----	0.00
Managers						
% Point Change	.60	.35	- 2.89	- 1.75	2.74	- .68
Percentage Change	45.45	4.87	-14.08	- 8.49	35.63	- 4.17
Clerical						
% Point Change	.40	.05	- .17	- .77	- 2.55	.79
Percentage Change	57.14	.86	- 1.99	- 5.30	-16.03	30.50
Sales						
% Point Change	.15	- .40	- .71	- 1.40	.03	.32
Percentage Change	62.50	-11.14	- 3.88	- 5.89	10.71	23.36
Craftsmen						
% Point Change	2.64	.98	2.14	- .57	- 2.68	- 1.03
Percentage Change	68.39	3.01	13.80	-10.27	-28.12	- 4.68
Operatives						
% Point Change	- .05	- 1.67	- .87	- .11	- .93	- 2.28
Percentage Change	- .50	- 5.40	- 3.62	- 3.93	-24.28	-19.47
Service						
% Point Change	.29	.67	.00	1.33	1.42	4.24
Percentage Change	87.87	43.51	.00	19.14	6.87	12.45
Laborers						
% Point Change	3.24	-2.30	1.21	- .36	- .80	-1.46
Percentage Change	116.97	-22.77	16.22	-17.31	-24.02	-21.73
Farm Laborers						
% Point Change	- .20	.00	.00	.00	.00	.00
Percentage Change	- .76	---	---	---	---	---

NOTE: Computed from Table

Table V-4

OCCUPATIONAL DISTRIBUTIONS WITHIN INDUSTRY SECTORS, 1960-1970, FEMALES (In Percent)

	Extractive	Transformative	Distributive Services	Producer Services	Social Services	Personal Services
Professional						
1960	.53	1.13	.87	2.44	36.76	.32
1970	1.81	1.52	1.04	3.25	32.65	.99
Semi-Professional						
1960	.72	1.75	.57	1.23	9.64	1.31
1970	2.11	2.55	1.09	2.92	8.78	1.17
Farmers						
1960	24.62	.00	.00	.00	.00	.00
1970	17.82	.00	.00	.00	.00	.00
Managers						
1960	.68	1.63	7.32	6.03	2.65	4.34
1970	1.20	1.44	6.38	5.71	2.95	4.15
Clerical						
1960	11.25	31.27	42.36	78.75	28.85	6.73
1970	23.59	30.91	45.92	76.06	30.31	11.05
Sales						
1960	.53	1.47	36.93	5.52	.18	.74
1970	1.20	.89	31.04	6.26	.26	1.22
Craftsmen						
1960	.42	3.34	1.41	.50	.27	.36
1970	.65	4.98	2.09	.58	.46	.80
Operatives						
1960	3.70	56.71	5.82	1.00	1.23	7.91
1970	3.98	54.80	6.76	1.23	.95	6.16
Service						
1960	1.39	1.37	4.21	4.42	20.30	78.07
1970	2.17	1.08	3.99	3.83	23.47	73.92
Laborers						
1960	.89	1.37	.55	.16	.16	.26
1970	5.05	1.88	1.75	.21	.23	.59
Farm Laborers						
1960	55.33	.00	.00	.00	.00	.00
1970	40.49	.00	.00	.00	.00	.00
Total Sample Size						
1960	(5,157)	(49,609)	(42,014)	(17,834)	(54,538)	(41,791)
1970	(3,275)	(56,642)	(54,423)	(26,768)	(89,068)	(40,545)

Table V-4

(Continued)

PERCENTAGE POINT CHANGE AND PERCENTAGE CHANGE OF OCCUPATIONAL CATEGORIES WITHIN INDUSTRY SECTORS, 1960-1970, FEMALES

	Extractive	Transformative	Distributive Services	Producer Services	Social Services	Personal Services
Professional						
% Point Change	1.28	.39	.17	.81	-4.11	.67
Percentage Change	241.51	34.51	19.54	33.20	-11.18	209.38
Semi-Professional						
% Point Change	1.39	.80	.52	1.69	- .86	- .14
Percentage Change	193.06	45.71	91.23	137.40	-8.92	10.69
Farmers						
% Point Change	-6.80	.00	.00	.00	.00	.00
Percentage Change	-24.62	---	---	---	---	---
Managers						
% Point Change	.52	- .19	- .94	- .32	.30	- .19
Percentage Change	76.47	-11.66	-12.84	-5.31	11.32	-4.38
Clerical						
% Point Change	12.34	- .36	3.56	-2.69	1.46	4.32
Percentage Change	109.69	-1.15	8.40	-3.42	5.06	64.19
Sales						
% Point Change	.67	- .58	-5.89	.74	.08	.48
Percentage Change	126.42	-39.46	-15.95	13.40	44.44	64.86
Craftsmen						
% Point Change	.23	1.64	.68	.08	.19	.44
Percentage Change	54.76	49.10	48.23	16.00	70.37	122.22
Operatives						
% Point Change	.28	-1.91	.94	.23	- .28	-1.75
Percentage Change	7.57	-3.37	16.15	23.00	-22.76	-22.12
Service						
% Point Change	.78	- .29	- .22	- .59	3.17	-4.15
Percentage Change	56.12	-21.17	-5.22	-13.35	15.62	-5.32
Laborers						
% Point Change	4.16	.51	1.20	.05	.07	.23
Percentage Change	467.42	37.23	218.18	31.25	43.75	88.46
Farm Laborers						
% Point Change	-14.84	.00	.00	.00	.00	.00
Percentage Change	-26.82	---	---	---	---	---

NOTE: Computed from Table

in 1970). Professionals and semi-professionals picked up two percentage points during the decade and now have 9% of the total employment in the sector.

One generalization that holds for all six sectors is that the occupational category with the largest share in a sector grows either very slowly or actually declines, as is seen from the following array for both sexes:

Sector	Largest Occupational Category	Percentage Increase 1960-1970
Extractive	Farmers	-18.57
Transformative	Operatives	-2.78
Distributive	Sales	-6.67
Producer services	Clerical	+2.43
Social services	Professional	-1.09
Personal services	Service	-1.57

We have here a consistent pattern, and note that for each sector a different occupational category is the largest one, an indication of the differences that occupations present within industry sectors. One of the ways the labor force is changing, therefore, is for at least some of the other occupational categories to have more rapid growth.

But what about the sexual differences, which are often important in this study? By examining the largest occupational categories for males and females separately, will we find the pattern confirmed?

Sector	Largest Occupational Category	Percentage Increase 1960-1970
Extractive		
Male	Farmers	-17.66
Females	Farm laborers	-26.82
Transformative		
Male	Craftsmen	3.01
Female	Operatives	-3.37
Distributive		
Male	Operatives	-3.62
Female	Clerical	8.40
Producer services		
Male	Sales	-5.89
Female	Clerical	-3.42
Social services		
Male	Professional	13.24
Female	Professional	-11.18
Personal services		
Male	Service	12.45
Female	Service	-5.32

In most sectors there are different occupational categories for males and females that are the largest; only Social and Personal services are identical (and for Social services, clerical very nearly is as large as professional). What is more, only in two sectors (Extractive and Producer services) do the largest occupational categories change in the same direction for both sexes. In Social services, for example, the figure for both sexes (-1.09%) is made up of a gain for males (13.24%) that is more than offset by the loss for females (-11.18%). The generalization we posited for both sexes holds only for females but not for males.

The meaning of the "diffusion" of occupational categories within sectors can be elaborated by developing somewhat more the example of professionals and of clerical. As earlier stated, the professional (and semi-professional) categories can be conceived of as indicators of expertise. In the 1960-1970 decade it is in those sectors with a low representation in these categories (Extractive, Distributive and Personal services) that had proportionately large gains. On the other hand Social services which had a large share (42% of total employment) in the two professional categories, actually declined during the decade. Consider specific industries within the Social services sector. Medical services had a marked decline, from 54% to 39% of the share the two professional categories represented of total employment. (This decline occurred for both males and females.) In contrast, service occupations rose for both sexes from 16% to 36%. We interpret this to mean that in these industries there is an effort to better utilize the labor of high professionals by taking on more low-paid help in the form of service workers. In contrast, hospitals, as an industry also in the field of health, showed much less of a decline in the two professional categories (40% to 37%), while services increased one percentage point to 40%. These changes in medical and hospital services during the 1960 to 1970 decade served to bring their occupational distribution closer together. Education within Social services is also an example of a prominent decline in the proportion professional and semi-professional during the decade: from 67% to 59%, with most of the decline due to females. This decline was offset by a substantial rise in managers for males (3% to 9%) and clerical for females (14% to 23%). In this instance males doubtless had a net gain in earnings while females had a net loss.

Clerical is an interesting occupational category. For some decades it has been one of the fastest-growing categories, and by 1970 it had become the single largest category, representing 18% of total employment. It is also an instance of marked sexual differences, for it is the one broad occupational category dominated by females, representing nearly three-quarters of total clerical employment. In no sector in 1970 do males have more than 14% of their employment in clerical, whereas only in Personal services are females less than 24%, rising to as high as 76% in Producer services.

We may take the rise of the clerical occupations within industries as an indicator of bureaucratization, for it is this group that carries the burden of "structural communication" that Weber included as a component of his classic definition of bureaucracy (Frisbie, 1975). We can therefore predict that all sectors and industries should show a relative gain in clerical, even at different rates, because all are subject, to one degree or another, to the pervasive influence of bureaucratization. But as with the earlier generalization about the largest occupational category in the sector, the degree of relative increase should depend upon the proportion of the total labor force that is clerical at the beginning of the period; the higher the proportion the slower the rate of increase.

The prediction is confirmed for the total population, with all six sectors having positive growth in clerical,and Extractive and Personal services, the sectors with the lowest 1960 representation in clerical, having much the largest percentage increases. For males, however, three sectors had negative growth, while two sectors of the females had declines. On the industry level, for both sexes there are instances of negative growth, though all but three are four percent or less. As already mentioned, medical had a sharp decline (-24%), while government (-10%) and communication (-8%) dropped less so.

More could be derived from Tables V-2, 3 and 4, not to mention a detailed analysis of individual industries. One could also introduce black-white comparisons, but our intention in this chapter is not primarily a consideration of who occupies what positions, but to demonstrate the interrelations of industry and occupation. We have established that there is much variation by occupation within sectors, as witness the earlier finding that each of the six sectors had a different occupational category as its largest one. This suggests that as the industry structure of employment changes, there are related changes in the occupational structure.

The Shift Approach Applied to Industries and Occupations. Despite the fact that many occupations are closely linked to specific industries, such as farmers to agriculture and transportation equipment operatives to transportation, there have been few attempts in the literature to study the linkage between the industry structure and the occupational structure. One early effort that unfortunately never received much attention was undertaken by Palmer and Miller (1949), who decomposed the growth of occupations into three components: the growth effect, the industry effect, and the occupation mix effect. The growth effect refers to that part of employment growth which could have been predicted on the basis of the growth of the total labor force, independent of any changes in the industry or occupational structures. The industry effect is the influence of the changes in the industry structure of the total labor force on a given occupation. Finally, the occupation mix effect refers to that part of the change in an occupation that is due to changes in the occupational distribution within industries.

This approach was later picked up by Ganasekaran (1966) in his paper "Interrelations Between Industrial and Occupational Changes in Manpower, United States, 1950-1960."

Our own approach received its original inspiration from these authors, but in the present formulation it has moved away from the idea of a threefold decomposition of occupational change to one of two categories: an industry shift effect and an occupation shift effect. Actually, although the industry-occupational analysis was carried out independently of the age analysis reported in Chapter IV, we gradually became aware of the similarity of the two approaches, as was also the case of the analysis of the 1965-1970 inter-sector changes of employment reported in Chapter III.

All have in common the shift share conception of decomposing change, and all depend upon the idea of comparing actual with expected change. In this section, we want to be able to identify what share of the change in the occupational structure was due to the changing industry structure that occurred during the 1960-1970 decade and how much of the occupational change was due to the variations in demands for occupational categories within the sectors and industries. It is not a procedure that is intuitively readily understood so our first step in examining Table V-5 will be to explicate the meaning of the various columns, using professionals in that table as our example.

Explication of Technique. Columns 1 and 2 are the actual numbers of persons in each of the eleven occupational categories. The totals of each column thus show the total labor force in 1960 and 1970, respectively. (It should be pointed out, again, that these figures were drawn from the 1/100 Public Use Sample, and they are not directly comparable to published tables.)

In Column 3 the 1970 labor force is distributed among the occupational categories in exactly the same proportions as is found in 1960. In other words, we assume that each occupational category grew at the same rate as the total labor force, thus keeping its proportionate share. Since the labor force expanded by 16.7% between 1960 and 1970, we multiplied each of the eleven categories by the same growth factor (714,839/612,494 = 1.1670955).

In Column 4, we assume that between 1960 and 1970 there were no changes in the occupational structure within industries, and therefore permitted only the industry structure to change as it did. Thus, we distributed the 1970 employment in a given industry among the eleven occupational categories in exactly the same proportions that were observed in 1960. Consider the example of medical services. In 1960, 44.8% of total employment in this industry was professional; we therefore assume that in 1970 44.8% of total employment in medical services was professional. This procedure was repeated in each of the 37 industries, and then the sum of these professionals in the 37 industries (75,629) is given in col.4. The sums for the other occupational groups reported in col.4 were obtained in similar fashion. This procedure involved 407 multiplications plus the summation of 37 figures for each of the eleven occupational categories. Consequently, rounding errors produced a grand total of 715,157, rather than the expected 714,839 of cols. 2 and 3, a .0005 percent error.

Column 5 refers to the actual change in each occupational category between 1960 and 1970. In our example, the number of professionals in the labor force increased by 23,833.

Expected change (col.6) is the difference between the number of persons in each occupational category in 1970 that could have been expected if each category had changed in the same way as the total labor force (col.3) and the actual number in each occupational category in 1960 (col.1). Since there was a 16.7% growth of the total labor force, all figures in col.6 are positive. Thus, the expected change in professionals (8,193) is arrived at by subtracting the actual number of professionals in 1960 (49,029) from the expected number in 1970 (57,222).

Although the actual change in each occupational category is important in its own right, the focus of this analysis is on the relationship between the occupational structure and the industry structure. It is not so much the absolute growth of an occupation in which we are interested, but is relative growth in comparison to the other occupations. In other words, we want to know

Table V-5

COMPONENTS OF OCCUPATIONAL NET SHIFT, 1960-1970, FOR TOTAL EMPLOYMENT

Occupational Category	Number Employed 1960 (1)	Number Employed 1970 (2)	1970 Total Weighted by 1960 Occup. Distr. (3)	1970 Total Weighted by 1960 Occup. Distr. Within 37 Indus. (4)	Actual Change 1960-1970 (2)-(1) (5)	Expected Change 1960-1970 (3)-(1) (6)	Net Shift (5)-(6) (7)	Components of Net Shift: Industry Shift Effect (4)-(3) (8)	Components of Net Shift: Occup. Shift Effect (2)-(4) (9)	% of Net Shift Due To: Industry Shift Effect (8)/(7) (10)	% of Net Shift Due To: Occup. Shift Effect (9)/(7) (11)
Professional	49,029	72,862	57,222	75,629	23,833	8,193	15,640	18,407	-2,767	117.7	-17.7
Semi-Professional	23,230	34,183	27,112	31,853	10,953	3,882	7,071	4,741	2,330	67.0	33.0
Farmer	24,957	13,201	29,127	15,195	-11,756	4,170	-15,926	-13,932	-1,994	87.5	12.5
Manager	53,596	60,751	62,551	64,857	7,155	8,955	-1,800	2,306	-4,106	-128.1	228.1
Clerical	92,821	128,796	108,331	117,833	35,975	15,510	20,465	9,502	10,963	46.4	53.6
Sales	46,340	52,006	54,083	55,562	5,666	7,743	-2,077	1,479	-3,556	-71.2	171.2
Craftsmen	87,025	98,261	101,566	98,571	11,236	14,541	-3,305	-2,995	-310	90.6	9.4
Operative	118,415	123,773	138,202	128,757	5,358	19,787	-14,429	-9,445	-4,984	65.5	34.5
Service	71,785	90,605	83,780	84,730	18,820	11,995	6,825	950	5,875	13.9	86.1
Laborers	30,787	31,440	35,931	33,338	653	5,144	-4,491	-2,593	-1,898	57.7	42.3
Farm Workers	14,509	8,961	16,933	8,834	-5,548	2,424	-7,972	-8,099	127	101.6	-1.6
TOTALS	612,494	714,839	714,838	715,157	102,345	102,344	1	321	-320		

Table V-6

COMPONENTS OF OCCUPATIONAL NET SHIFT, 1960-1970, FOR EMPLOYED WHITE MALES

Occupational Category	Number Employed		1970 Total Weighted by 1960 Occup. Distr. (3)	1970 Total Weighted by 1960 Occup. Distr. Within 37 Indus. (4)	Actual Change 1960-1970 (2)-(1) (5)	Expected Change 1960-1970 (3)-(1) (6)	Net Shift (5)-(6) (7)	Components of Net Shift		% of Net Shift Due To:	
	1960 (1)	1970 (2)						Industry Shift Effect (4)-(3) (8)	Occup. Shift Effect (2)-(4) (9)	Industry Shift Effect (8)/(7) (10)	Occup. Shift Effect (9)/(7) (11)
Professional	27,301	38,492	28,676	35,249	11,191	1,375	9,816	6,573	3,243	67.0	33.0
Semi-Professional	15,553	20,985	16,336	18,643	5,432	783	4,649	2,307	2,342	49.6	50.4
Farmer	21,892	12,147	22,995	13,537	-9,745	1,103	-10,848	-18,131	7,283	167.1	-67.1
Manager	44,608	48,070	46,855	49,266	3,462	2,247	1,215	2,411	-1,196	198.4	-98.4
Clerical	27,812	29,528	29,213	30,761	1,716	1,401	315	1,548	-1,233	491.4	-391.4
Sales	28,895	30,488	30,351	31,684	1,593	1,456	137	1,333	-1,196	973.0	-873.0
Craftsmen	79,449	83,975	83,451	83,768	4,526	4,002	524	317	207	60.5	39.5
Operative	75,121	70,252	78,905	75,115	-4,869	3,784	-8,653	-3,790	-4,863	43.8	56.2
Service	20,205	27,855	21,223	24,361	7,650	1,018	6,632	3,138	3,494	47.3	52.7
Laborers	20,902	21,228	21,955	21,162	326	1,053	-727	-793	66	109.1	-9.1
Farm Workers	7,863	5,199	8,259	4,864	-2,664	396	-3,060	5,278	-8,338	-172.5	272.5
TOTALS	369,601	388,219	388,219	388,410	18,618	18,618		191	-191		

Table V-7

COMPONENTS OF OCCUPATIONAL NET SHIFT, 1960-1970, FOR EMPLOYED BLACK MALES

Occupational Category	Number Employed 1960 (1)	Number Employed 1970 (2)	1970 Total Weighted by 1960 Occup. Distr. (3)	1970 Total Weighted by 1960 Occup. Distr. Within 37 Indus. (4)	Actual Change 1960-1970 (2)-(1) (5)	Expected Change 1960-1970 (3)-(1) (6)	Net Shift (5)-(6) (7)	Components of Net Shift: Industry Shift Effect (4)-(3) (8)	Components of Net Shift: Occup. Shift Effect (2)-(4) (9)	% of Net Shift Due To: Industry Shift Effect (8)/(7) (10)	% of Net Shift Due To: Occup. Shift Effect (9)/(7) (11)
Professional	604	1,081	633	1,000	477	29	448	367	81	81.9	18.1
Semi-Professional	530	1,078	556	714	548	26	522	158	364	30.3	69.7
Farmer	1,515	285	1,589	609	-1,230	74	-1,304	-980	-324	75.2	24.8
Manager	588	1,066	617	649	478	29	449	32	417	7.1	92.9
Clerical	1,827	2,871	1,916	2,378	1,044	89	955	462	493	48.4	51.6
Sales	495	757	519	564	262	24	238	45	193	18.9	81.1
Craftsmen	3,510	5,245	3,681	3,980	1,735	171	1,564	299	1,265	19.1	80.9
Operative	8,785	10,238	9,213	10,047	1,453	428	1,025	834	191	81.4	18.6
Service	5,436	5,588	5,701	6,170	152	265	-113	469	-582	-415.0	515.0
Laborers	7,332	5,365	7,690	7,692	-1,967	358	-2,325	2	-2,327	-0.1	100.1
Farm Workers	2,583	1,250	2,709	1,039	-1,333	126	-1,459	-1,670	211	114.5	-14.5
TOTALS	33,205	34,824	34,824	34,842	1,619	1,619		18	-18		

Table V-8

COMPONENTS OF OCCUPATIONAL NET SHIFT, 1960-1970, FOR EMPLOYED WHITE FEMALES

Occupational Category	Number Employed		1970 Total Weighted by 1960 Occup. Distr. (3)	1970 Total Weighted by 1960 Occup. Distr. Within 37 Indus. (4)	Actual Change 1960-1970 (2)-(1) (5)	Expected Change 1960-1970 (3)-(1) (6)	Net Shift (5)-(6) (7)	Components of Net Shift		% of Net Shift Due To:	
	1960 (1)	1970 (2)						Industry Shift Effect (4)-(3) (8)	Occup. Shift Effect (2)-(4) (9)	Industry Shift Effect (8)/(7) (10)	Occup. Shift Effect (9)/(7) (11)
Professional	18,997	28,281	25,172	31,667	9,284	6,175	3,109	6,495	-3,386	208.9	-108.9
Semi-Professional	6,395	9,723	8,474	9,689	3,328	2,079	1,249	1,215	34	97.3	2.7
Farmer	955	549	1,265	658	-406	310	-716	-607	-109	84.8	15.2
Manager	7,433	9,335	9,849	10,051	1,902	2,416	-514	202	-716	-39.3	139.3
Clerical	59,808	84,971	79,248	81,719	25,163	19,440	5,723	2,471	3,252	43.2	56.8
Sales	15,907	18,336	21,077	20,566	2,429	5,170	-2,741	-511	-2,230	18.6	81.4
Craftsmen	2,247	4,188	2,977	2,831	1,941	730	1,211	-146	1,357	-12.0	112.0
Operative	28,310	30,769	37,512	31,792	2,459	9,202	-6,743	-5,720	-1,023	84.8	15.2
Service	29,968	39,522	39,709	37,567	9,554	9,741	-187	-2,142	1,955	1145.4	-1045.4
Laborers	816	2,062	1,081	994	1,246	265	981	-87	1,068	-8.9	108.9
Farm Workers	1,679	853	2,225	1,157	-826	546	-1,372	-1,068	-304	77.8	22.2
TOTALS	172,515	228,589	228,589	228,691	56,074	56,074		102	-102		

Table V-9

COMPONENTS OF OCCUPATIONAL NET SHIFT, 1960-1970, FOR EMPLOYED BLACK FEMALES

Occupational Category	Number Employed 1960 (1)	Number Employed 1970 (2)	1970 Total Weighted by 1960 Occup. Distr. (3)	1970 Total Weighted by 1960 Occup. Distr. Within 37 Indus. (4)	Actual Change 1960-1970 (2)-(1) (5)	Expected Change 1960-1970 (3)-(1) (6)	Net Shift (5)-(6) (7)	Components of Net Shift: Industry Shift Effect (4)-(3) (8)	Components of Net Shift: Occup. Shift Effect (2)-(4) (9)	% of Net Shift Due To: Industry Shift Effect (8)/(7) (10)	% of Net Shift Due To: Occup. Shift Effect (9)/(7) (11)
Professional	1,423	2,390	1,818	3,107	967	395	572	1,289	-717	225.3	-125.3
Semi-Professional	335	953	428	673	618	93	525	245	280	46.7	53.3
Farmer	147	24	188	58	-123	41	-164	-130	-34	79.3	20.7
Manager	247	436	316	377	189	69	120	61	59	50.8	49.2
Clerical	1,816	6,062	2,320	4,261	4,246	504	3,742	1,941	1,801	51.9	48.1
Sales	336	728	429	615	392	93	299	186	113	62.2	37.8
Craftsmen	166	400	212	315	234	46	188	103	85	54.8	45.2
Operative	3,069	4,701	3,921	5,015	1,632	852	780	1,094	-314	140.2	-40.2
Service	14,058	12,374	17,960	13,698	-1,684	3,902	-5,586	-4,262	-1,324	76.3	23.7
Laborers	238	456	304	414	218	66	152	110	42	72.4	27.6
Farm Workers	705	273	901	276	-432	196	-628	-625	-3	99.5	0.5
TOTALS	22,540	28,797	28,797	28,809	6,257	6,257		12	-12		

whether an occupation increased or decreased its share of total employment between 1960 and 1970 and what the sources of this change are. To that end, we computed the net shift (col.7) by subtracting the expected change from the actual change. Positive net shifts indicate that these occupational categories increased more than expected, while negative net shifts are obtained when the actual is smaller than the expected change. Column 7 shows that the actual growth of professionals far exceeded their expected growth, resulting in a net shift of 15,640.

Columns 8 and 9 present the components of the net shift. Column 8 is termed the "industry shift effect," which is the effect of the changes in the industry structure on the net shift of the occupational structure. These figures are derived by subtracting the number of persons in each occupational category in 1970 had there been no change in the occupational structure in 1960 (col. 3) from the number of persons in each category in 1970 that would have been observed had only the industry structure of the labor force changed between 1960 and 1970 without any changes in the occupational distribution of employment within each of the 37 industries (col.4). To interpret col.8 we need to return to the meaning of cols. 3 and 4. Column 3 posits a 1970 occupational distribution based on the assumption that there were no changes in the occupational and industry structures of employment. Column 4, in contrast, permits the distribution of total employment among the 37 industries to change the way it actually did, holding constant only the occupational distribution within industries. Therefore, by subtracting col. 3 from col. 4, we capture in col. 8 the amount of occupational change that occurred as the result of the industry changes between 1960 and 1970. A positive industry shift indicates that changes in the industry structure of the labor force results in a larger than expected increase in employment in that occupation, whereas a negative industry shift indicates that the changing industry structure did not favor that particular occupation. Consider the case of professionals. Without any changes in the proportion of professionals in each of the 37 industries during the 1960-70 period, the changes in the industry structure would have resulted in an increase of 18,407 professionals.

In Column 9 we subtract the number of the number of persons in each occupational category in 1970 that would have been observed had only the industry structure of the labor force changed between 1960 and 1970 without changes in the occupational distribution of employment within the 37 industries (col. 4) actual number of persons in each occupational category in 1970 (col. 2). Since the figures in col. 2 are the result of changes in both the occupational distribution of employment within industries and the industry structure of the labor force, subtracting col. 4 from col.2 yields the amount of occupational change that occurred as the result of change in the occupational distribution of employment between 1960 and 1970. Positive occupational shifts note that changes in the occupational distribution of employment within industries favored an increase of employment in an occupation that was faster than that of the total labor force, while negative occupational shifts contributed to a slower growth of employment in an occupation as compared to the labor force. In the case of professionals, the changes in the occupational distribution of employment within industries would have resulted in 2,767 less professionals than expected had the industry structure of the labor force not changed.

Columns 10 and 11 express the industry shift effect and the occupational shift effect as proportions of the total net shift. It can be seen from these figures that the proportionate increase in professionals entirely was due to the changing industry structure of the labor force. In fact, the proportionate increase of professionals would have been even more pronounced had there not been a negative occupational shift effect.

Interpretation of Occupational Net Shifts. Table V-5 shows that only the two farm occupational categories decreased in absolute numbers (col. 5). We pointed out earlier, however, that it is not so much the growth of the labor force in *absolute* numbers which interests us, but rather the changes in the relative standing of the various occupational categories. In other words, we are concerned with changes in the occupational *structure*.

The changes in the occupational structure are given in col. 7, which contains the net shift between 1960 and 1970 for each occupational category. This column is comparable to the data in Table V-1: wherever negative net shifts occur in col. 7 of Table V-5, Table V-1 shows that particular occupational category had a smaller share of total employment in 1970 than in 1960. These changes already have been discussed in an earlier part of this chapter and need not be repeated. The purpose of this analysis, instead, is to identify the relative magnitude of the industry shift effect and the occupational shift effect on the changes in the occupational structure of the labor force between 1960 and 1970.

We will begin with the farm occupations, since their changes are the easiest to interpret. It can be seen in Table V-5 that the number of farmers as well as farm laborers not only grew less rapidly than the total labor force (col. 7), but actually declined absolutely (col. 5) during the 1960's. There were 17,304 fewer farmers and farm laborers in 1970 than ten years earlier. The decline of farmers was largely due to the industry shift effect (cols. 8 and 10). As agriculture declined (which is the only industry in which farmers and farm workers are to be found), the number of farmers decreased as well. But the occupational shift effect also contributed to the decline in the numbers of farmers, although to a much smaller extent (col. 11). For farm workers, the situation is a bit different. Although they, too, had a smaller share of total employment in 1970 than in 1960, this decrease was entirely the result of the changing industry structure, i.e., the decrease of employment in agriculture. These findings are quite consistent with the general changes in agriculture during the past decades. During that time agriculture has more and more taken on the character of agribusiness; small farmers have declined to a large extent and a limited number of farms now accounts for an ever-increasing share of total cultivated land. These developments brought with them the introduction of large corporations and, as a result, an increasing share of laborers, professionals, and even clerical workers is needed.

Table V-5 identifies several other occupational categories where growth did not keep pace with the expansion of the total labor force between 1960 and 1970. All three manual occupations (craftsmen, operatives, and laborers) experienced a relative decline in their shares of total employment. In the case of craftsmen, the decline was very much the result of the shift of employment from industries which employ large proportions of craftsmen to industries that employ smaller proportions of craftsmen. Only 9.4% of the net shift was due to the fact that within industries the employment of operatives decreased during the 1960's. A similar general pattern exists for operatives and laborers, except that in both of these cases, while the industry shift effect was the main source of the negative net shift, the occupational shift effect contributed a substantial proportion (34.5% and 42.3% respectively) to the negative net shift. These findings are consistent with the earlier discussion of the decline of the share of total employment in the Transformative sector. Since employment in Transformative industries is concentrated in these three manual categories (in 1970, two-thirds of all workers in the Transformative sector were craftsmen, operatives, or laborers), the decrease in the proportion of the labor force in these industries resulted simultaneously in a decrease in the proportion of total employment in these occupational categories.

The other two occupational categories that expanded more slowly than the total labor force are managers and sales workers. In both cases, the negative net shift was the result of occupational shifts within industries. In fact, the industry structure of employment changed in such a way as to favor the growth of employment in these two occupations. But since the industry shift effect was not as strong as the occupational shift effect,managers and sales workers expanded less than the total labor force.

Four occupational categories benefitted from the net shifts (professionals, semi-professionals, clerical, and service workers), but the findings in Table V-5 show clearly that the disproportionate growth of employment in these occupational categories was the result of different patterns. For professionals, it was wholly due to changes in the industry structure. As employment shifted towards services in general, and Social services in particular, which traditionally employ larger proportions of professionals than goods-producing industries, professionals as proportion of total employment grew as well. A similar trend is observed for semi-professionals, but here only two-thirds of the shift was due to the industry effect. Table V-5 shows, moreover, that the changes in the occupational distribution of employment within industries had the opposite effect on professionals: in 1970 proportionately fewer professionals were employed within industries than ten years earlier. This deflating impact on the growth of professionals, however, was not strong enough to neutralize the influence of the industry shift that favored the growth of professionals.

The changes in the employment of service workers, which also expanded more than the total labor force, was nearly the opposite as that for professionals. This disproportionate growth very largely was the result of changes in the occupational distribution within industries. Since professionals and service workers are found in services in larger proportions than in goods-producing industries, their opposite patterns can be interpreted in relation to each other. It appears from the trends of professionals and service workers that there is a tendency within industries to employ service workers for positions that formerly were held by professionals. The best example of this are hospitals, in which nurses' aides (who are service workers) perform more and more functions that formerly were carried out by nurses (who are professionals). This trend is quite comparable to the attempts within Transformative industries, for example, to standardize work as much as possible. The fewer case-by-case decisions there are to be made, the less skilled personnel are needed. It therefore can be expected that as service establishments become larger in size and more bureaucratized, they will employ a decreasing proportion of professionals; service workers should be one of the occupational categories benefitting from this change in the occupational distribution.

The largest proportion of the total positive net shifts (40.9%) is accounted for by clerical occupations. The disproportionate growth of clerical occupations resulted almost equally from the changes in the industry structure and the occupational distribution of employment within industries, with the occupational shift effect being slightly more important than the industry shift effect. These findings suggest that clerical occupations not only expanded as a result of the growth of industries, such as Producer services which use large proportions of clerical workers, but that their growth also resulted from the fact that within the industry sectors larger proportions of clerical workers were employed. With work being carried out more and more within formal organizations, clerical-type activities have increased remarkably and with them the number of clerical workers.

What can be said about the industry versus occupational effect for all employed persons, rather than for particular occupational categories? In Table V-10 we see that for the total employed, two-thirds of the occupational change is accounted for by the industry shift effect. This figure was arrived at by first summing in col. 7, Table V-5, all positive net shifts. (This same figure could be derived by summing total negative net shifts, since the two sums cancel each other.) We then summed the industry shift of all those occupational categories with positive net shifts (col. 8, Table V-5), and the same was done for the occupational net shift effect (col. 9, Table V-5).

We have also made the same calculations for the four sex-race groups, and we find (Table V-10) that for white males, white females and black females, changes in the industry structure were an even more important source for occupational change, ranging from three-quarters to four-fifths of the total. For these three groups, very little occupational change was due to changes in the occupational distribution within industries. The one exception is black males, for which the industry effect was only 42.2%. This comes as a surprise, for as we will demonstrate later in Chapter VII, black males experienced much greater change in their allocation to industries than white males. We therefore would have anticipated that the industry shift effect would have been the larger component. This finding suggests that for black males the industry shifts have not resulted in employment in different occupations to the extent that could have been expected. This reasoning comes up against the pattern for black females, which is quite different than for the black male pattern. We don't have the explanation for this difference, but we suspect that the large industry shift effect for black females is the result of their remarkable decline in domestic service, from 38% in 1960 to 18% in 1970.

SEX-RACE DIFFERENCES IN THE PATTERNS OF OCCUPATIONAL CHANGE

We now turn to a cursory examination of Tables V-6, 7, 8, and 9 where the same procedure as for the total employed is applied to the four sex-race groups. Our main attention will be devoted to those instances where there are significant deviations from that demonstrated by total employment.

Farmers and farm workers display much the same pattern for the four sex-race groups as for the total labor force. In each instance the relative decline of these two occupational categories mainly resulted from the industry shift effect, that is, the decline of employment in agriculture, the only industry in which these workers are to be found.

Table V-10

COMPONENTS OF OCCUPATIONAL CHANGE FOR TOTAL EMPLOYED AND RACE-SEX GROUPS, 1960-1970

		NET SHIFT DUE TO:			
	Total Positive Net Shift	Industry Shift Effect (Number)	Occupational Shift Effect (Number)	Industry Effect (Percent)	Occupational Effect (Percent)
Total Employed	50,001	33,600	16,401	67.2	32.8
White Males	23,288	17,627	5,661	75.7	24.3
Black Males	5,201	2,197	3,004	42.2	57.8
White Females	12,273	9,948	2,325	81.1	18.9
Black Females	6,378	5,029	1,349	78.8	21.2

Next, we will consider the three manual occupational categories, craftsmen, operatives and laborers. For craftsmen all sex-race groups experienced a positive net shift. Although the components of this shift differed among the groups, these differences largely can be neglected, since craftsmen are almost a negligible category for females. Moreover, the industry shift effect and the occupational shift effect, in relation to the size of this occupational category, were minute for three of the groups. Only black males experienced a substantive occupational shift effect and, consequently, a 33 percent increase in the share of employment in craft occupations. For operatives we again observe a difference by race: whites experienced a proportionate decrease whereas blacks had a proportionate increase. This finding is not unexpected, for we earlier had demonstrated that the proportion of black employment in the Transformative sector increased in the 1960-1970 decade. The figures show in fact that the positive net shifts for blacks mainly were the result of changes in the industry structure (this component was the sole source for black females).

For laborers there is a sex difference for net shifts. For males the proportion declined while it increased for females. There are differences by sex and race in the way the components produced these shifts, but the combinations are different for each group and therefore cannot be readily interpreted. It is interesting to note, however, that for black males the proportionate decrease of laborers mainly is due to the occupational shift effect. In other words, it was less the increase of black males in Transformative industries (see Chapter VII) which contributed to this shift from laborers to operatives, but rather changes in the way black males were employed within industries.

As in the case of laborers, the trends of managers and sales workers are quite different for the four race-sex groups. On the one hand, similarities exist in the sense that for all groups but white females there were positive net shifts for the two occupational categories. On the other hand, however, the ways by which changes in the industry structure and changes in the occupational distribution within industries contributed to the net shifts of these two occupations differ among the four race-sex groups.

Let us first take up the case of managers. For all four race-sex groups, the industry shift effect favored an increase in the number of professionals, but the magnitude of this effect differed widely among the groups. The effects of the occupational shift differed mainly by race; for whites, changes in the occupational distribution within industries had a negative impact on the growth of managers, whereas for blacks they favored the growth of this occupational category. We should note, however, that for whites the share of employment in managerial occupations changed very little and that the industry shift effect and the occupational shift effect also are very small in comparison with the number of whites in 1960 that were managers. For that reason, the influence of the industry shift and the occupational shift for managers is relatively unimportant for whites. But this is not so for blacks. The net shift for black males represents an increase of 76.4% over the number of black males in 1960 that were managers, and a corresponding increase for blacks of 48.6%. This is the more remarkable as the net shift is independent of the growth of total employment of these two groups. For black males the industry shift effect is negligible as a source for the net shift of managers. On the one hand, the share of employment of black males in Personal services in which managers are an important occupational category declined, but this decline was neutralized by the disporportionate growth of black males in other industries, such as trade, banking and government, in which there are also many managers. Table V-7 thus shows that the increase in the share of black males in managerial occupations predominantly is the result of occupational changes within industries. For black females, the shift of employment towards industries with high proportions of managerial occupations was more pronounced. As a result, the industry shift effect and the occupational shift effect contributed in equal proportions to the positive net shift of managers.

The shift for sales workers and their components are very similar to those of managers. But two differences merit attention. First, in the case of white females the industry shift effect *and* the occupational shift effect contributed to the negative net shift of sales workers, although the latter by far was the more important factor. Second, the small net shifts of sales workers for white males is somewhat misleading, since they are the result of substantial, although opposite, effects of changes in the industry structure and in the occupational distribution within industries. The figures in Table V-6 show that the change in the industry structure greatly favored an increase in the share of total white males in sales occupations, but this trend was countered, with almost the same magnitude, by decreases in the proportions of sales workers within industries. As a result, there was almost no net shift.

The proportion of employment in clerical occupations increased for all sex-race groups. For black males and white and black females, changes in the industry structure and the occupational distribution within industries contributed similarly to the positive net shift. White males only had a very small positive net shift. The small magnitude is misleading, however, for it was the result of offsetting effects: the industry shift effect favored the growth of clerical employment whereas the occupational shift effect disfavored these occupations.

Service occupations are similar to clerical to the extent that white males have a different pattern than the other three groups. For white males the share of employment in service occupations increased in contrast to the decrease for the other three groups. The situation of black females supports our earlier statement that the large industry shift effect on their occupational changes mainly was the result of the decline of black females in domestic service. Employment in this industry is exclusively service work (98.9% of all black females in domestic service were in that occupational category in 1970). As the figures in Table V-9 show, service work not only is the major occupational category for black females; it also accounted for the largest share of total net shifts.

Professionals and semi-professionals have a basically congruent pattern by sex and race. In the case of professionals, the main source of the positive net shift were the changes in the industry structure. For females the industry shift effect was the sole source of the positive net shift, since within industries there was a decreasing demand for professionals. As for semi-professionals, both industry and occupational shift effects contributed to the net positive shift. In this instance we observe a race rather than sex difference in that for whites the industry shift effect was the predominant source for the positive net shifts, while for blacks it was the occupational shift effect.

The pattern of professionals and semi-professionals for the four sex-race groups demonstrates that all groups reinforced the increase in the share of total employment in these two occupational categories. In most other categories, however, offsetting patterns were observed. For whites, the share of employment as operatives decreased, whereas it increased for blacks. In the case of laborers, males decreased while females increased. Similar sex-race differences can be found in the relative importance of the industry shift effect and the occupational shift effect for occupational changes of the four groups. In the case of professionals, for example, we observed that the occupational changes within industries did not favor the employment of females as professionals, whereas they reinforced the growth of male professionals. These offsetting patterns are the result of differences in the allocation of males and females and of whites and blacks to industries and occupations. For that reason, the next two chapters examine the position of females and minorities in the labor force.

Chapter VI

FEMALES IN THE LABOR FORCE

The growing importance of females in the service sectors is one of the more prominent and interesting aspects of the sectoral transformation of the labor force. This chapter will address itself to a variety of topics: why women are entering the labor market, what industries and occupations they fill, what degree of sex-typing is occurring, and the implications for women's status and future employment.

Female labor force participation must be analyzed differently than male labor force participation. In the prime adult years, 25-55, upwards of 95 percent of males are in the labor force and there are strong sanctions favoring work; even those who could qualify as members of the leisure class generally report some form of employment. But increasingly the woman has several options. She can remain unmarried or decide on a childless marriage and work full time; she can enter, leave and re-enter the labor force according to stages in her family life cycle; or she can marry and be a housewife only. Although similar options always have been available to men, it is the traditional view that *women* have to raise children, and it is the relation between home and work that currently makes female labor force participation such a complex and important subject.

The literature on women in the labor force is growing rapidly. Bowen and Finegan (1969) produced a major study on labor force participation, joining others like Bancroft (1958), McNally (1969), and Cohen (1969), to name only a few. Other important aspects include women in the professions (Blitz, 1974; 1973) and the relationship between marriage, fertility, and female labor force participation (Sweet, 1973; Kiser, *et al.*, 1968). Yet another group of studies has been concerned with the societal conditions for the participation of women in the labor force (Oppenheimer, 1970; Youssef, 1974). The Human Resources Center of Ohio State University under the direction of H. Parnes published an extensive study entitled "Dual Careers: A Longitudinal Study of the Labor Market Experience of Women" for the U.S. Department of Labor (1970). All these studies agree that a woman's decision to enter the labor force is influenced by her marital status, age, race, education, presence and ages of children, husband's earnings, and even other characteristics like health and attitudes toward home.

Oppenheimer (1969) has related the historical participation of women to their family life cycles. In 1900 the highest work rate for women was for those under 25 years of age, which means that women worked until they married and then dropped out of the labor force to raise a family. This pattern changed after 1950. Single women still have the highest work rates. Married women still drop out of the labor force to raise children, but they increasingly re-enter the labor force in their late thirties. The data thus show the labor force participation of women to have two peaks: between 20-24 and 45-54 years of age.

The Parnes study found that on the whole married women have lower participation rates than single, divorced or widowed women. The rates, moreover, are lower for women with school-age children than for those with no children under 18, and the participation rate of women is inversely related to husband's earnings and positively related to the woman's level of education. The study further pointed out that for women the decision to work is made within the family context and it is much influenced by the husband's attitude and the couple's perception of family needs.

The 1973 Manpower Report of the President called attention to the remarkable increase in the number of females in the labor force during the past 35 years. Between 1947 and 1971 the female labor force almost doubled, increasing from 16.7 million to over 32 million. Yet the female population as a whole only increased 40 percent, from 52 million to 74 million. These data indicate quite clearly that today women are more likely to be in the labor force than they were 25 years ago. In 1960 somewhat more than a third (37.1 percent) of all females 16 years and older worked. This increased to 42.8 percent in 1970. Men of the same age, in contrast, decreased, falling from 82.4 to 79.2 percent between 1960 and 1970. As a consequence of these divergent trends, women comprised 32.1 percent of the total labor force in 1960 and 36.7 percent in 1970.

The question remains, however, whether the labor force will experience a continued rise in the participation of women. As Waldman and McEaddy (1974: 13) put it, "Tomorrow's working women will be affected not only by the measure of success achieved today, but also by economic conditions, changes in lifestyle (for example, smaller families) the mode of enforcement of legislation prohibiting discrimination, provision of child care services for mothers on industry payrolls, and the extent of formal education or technical training of women for traditionally male occupations." These conditions must be kept in mind when evaluating labor force projections.

Denis F. Johnston (1973), in his article "The U.S. Labor Force: Projections to 1990," predicts a modest growth for women workers, but he does not expect females to come close to males in their labor force participation rates. More and more women will enter the labor force, but never in the numbers of men, and they still will have a bi-modal lifetime participation distribution curve. Johnston notes that women were 32.3 percent of the labor force in 1960 and 37.4 percent in 1970. His projections allow only a rise to 38.5 percent in 1980 and 38.7 percent in 1990. He sees this leveling off as due to a change in age composition of the labor force, with declines in the number of young women and very small increases in the number of women 45-64 years old.

Yet only a few years after these projections were made, the actual labor force participation of women had already surpassed the figure projected by Johnston for 1990. As of April 1975, women were 39 percent of the total labor force. Of particular importance is the fact that women with school-aged children have higher participation rates than women with no children (52.3 and 43.9 percent, respectively, in March 1975). Thus, the findings of earlier studies (e.g., U.S. Department of Labor, 1970) which suggested that the presence of children prevents women from participating in the labor force, are no longer valid in the case of school-age children. (The data for the preceding and following paragraphs were submitted to us by the U.S. Department of Labor, Women's Bureau.)

As a result of this trend, the labor force participation rate of women now has one peak in the 20-24 age group instead of the traditional bimodal participation curve. The April, 1975 data serve as an illustration of the changing situation: 62.5 percent of all women aged 20-24 participated in the labor force. For the 25-34 age group, the rate decreased to 54 percent, and remains at that level for women aged 35-44 and 45-54 (with respective participation rates of 56.2 and 54.8 percent).

There has been much speculation in recent years regarding women's increased participation. Factors identified as responsible for this increase include the shift away from physical work in the economy, the work experience of women during World War II, the women's rights movements, the increased use of labor-saving devices in the home, and the trend towards lower fertility coupled with the increased ability to control the timing of fertility. The 1973 Manpower Report of the President, for example, emphasized how the recent sharp decline in birth rates will have a marked impact on the size and age-sex distribution of the labor force in future years. If the present two-child family persists, then labor force projections will show a 70 percent increase in the number of economically active females aged 25-34 during the 1970's. In other words, lower fertility means less family duties for the married woman and this affords more time to be in the labor force.

Victor Fuchs in his book The Service Economy (1968) contends that because most occupations in the service sector do not rely on physical strength, women are able to compete on a more equal footing with men. On this basis he foresees that the advent of a service economy should make for greater work equality between the sexes. Fuchs also notes that services are attractive to women because such jobs are more amenable to part-time work.

But Fuchs' definition and prediction of equality can be challenged. As will be shown in this chapter, a considerable amount of sex-typing on both the occupational and industrial level prevents women from attaining higher status or higher-paying jobs. Unless basic female role changes are made, the "service economy" will bring with it the same stereotyping as was brought forth by the industrial revolution. Women are still the chief child raisers in this society and until the responsibility is more fully shared, women will continue to drop out of the labor force at a crucial time in their careers. Beyond this is a world view which sees the male and female spheres in mutually exclusive terms. Fuchs is correct in postulating that the reduction of jobs requiring physical strength will open many opportunities for women; however, as the war-time experience showed, women have not been able to preserve those gains. Throughout recent decades, something else has dominated: consumer discrimination, employer discrimination, employee discrimination, and the ambivalence of women themselves, to name a few.

Fuchs recognizes this problem of roles in many of his other articles on women. He claims that role differentiation is the major explanation for the earnings differential between men and women. He believes these roles begin early in childhood with the socialization process and eventually affect labor force attachment, choice of occupation location and hours of work, post-school investment, and consumer and fellow employee attitudes.

It must be pointed out that no matter what is defined as a "woman's job," the highest paid positions in the field go usually to a man. Cooking is 'woman's work,' yet the best and highest paid cooks are men. Women care for the sick, and supposedly that's why women are nurses. If so, why are they not doctors? Women are reportedly more dextrous with their "small hands" than men, and that's why women sew, yet why are they not neurosurgeons? Role differentiation explains much of earnings differential between men and women, yet there seems always to be an element of power and control from those on top who are usually men.

Traditionally, the woman's role primarily has been that of nuturing her family, and even when women enter the formal labor force it is noteworthy how closely work roles correspond to home roles. Domestic service is the most obvious example, but nursing, teaching retailing ("waiting" on customers), and even employment in the textile and food industries are clearly related to "traditional" family roles. Clerical work may appear to be an exception, but most secretaries in their relation to their male bosses have a nurturant role and the label office wife, is well applied.

It is the purpose of this chapter to examine whether or not the concentration of women in service industries of one kind or another has brought about major changes in the way women are employed. In 1960 the four service sectors combined accounted for almost three-fourths of the total female labor force, and by 1970 this proportion had increased to 78 percent (see Table VI-1). In contrast, the respective values for males are 48 and 53 percent. It is of interest that as far back as 1920 the proportion of females occupied in service industries (58.5 percent) was greater than the 1970 proportionate share of males in these industries. Despite the early concentration of females in various services, these industries continued to absorb proportionately more females than did non-service industries during the 1960's. In addition, since females increased their proportion of the total labor force from 32.8 percent in 1960 to 37.6 percent in 1970, the share of services has become increasingly important. In the future, even if males and females maintained their 1970 employment shares in each industry and each sector, an increase in the proportion of the labor force that is female would bring about additional growth of service employment, due to the fact that females are more heavily concentrated in services than in the other industries. This presupposes that women will not enter the Extractive and Transformative sectors at a faster rate than they do now. If in 1970, for example, the labor force had been one-half male and one-half female, services would have accounted for 65.5 percent of total employment (provided no change in the labor force distribution of males and females) instead of the actual 62.4 percent. Thus, if in the future the proportion of women in the labor force increases even more, a close examination of the way women are now employed is quite important.

Table VI-1

PERCENTAGE DISTRIBUTION OF THE U.S. LABOR FORCE BY INDUSTRY SECTORS, INTERMEDIATE INDUSTRY GROUPS BY SEX, 1960 AND 1970

Sectors and Industries	1960 Males	1960 Females	1960 Difference	1970 Males	1970 Females	1970 Difference
I. *EXTRACTIVE*	*10.7*	*2.4*	-8.3	*6.5*	*1.2*	-5.3
1) Agriculture	9.2	2.2	-7.0	5.3	1.0	-4.3
2) Mining	1.5	0.2	-1.3	1.2	0.2	-1.0
II. *TRANSFORMATIVE*	*41.3*	*23.5*	-17.8	*40.5*	*20.9*	-19.6
3) Construction	8.7	1.0	-7.7	8.7	0.9	-7.8
4) Food	3.4	2.3	-1.1	2.4	1.4	-1.0
5) Textile	2.1	6.2	4.1	1.7	5.1	3.4
6) Metal	4.6	1.5	-3.1	4.5	1.2	-3.3
7) Machinery	9.5	4.8	-4.7	10.4	5.0	-5.4
8) Chemical	2.2	1.0	-1.2	1.8	0.9	-1.0
9) Misc. manufacturing	9.0	6.0	-3.0	8.8	5.9	-2.9
10) Utilities	1.9	0.6	-1.3	1.9	0.5	-1.4
III. *DISTRIBUTIVE SERVICES*	*22.8*	*19.9*	-2.9	*23.6*	*20.1*	-3.5
11) Transportation	5.9	1.3	-4.6	5.3	1.5	-3.8
12) Communication	1.0	2.0	1.0	1.2	2.0	.8
13) Wholesale	4.2	2.3	-1.9	5.0	2.6	-2.4
14) Retail	11.7	14.2	2.5	12.0	14.1	2.1
IV. *PRODUCER SERVICES*	*5.9*	*8.5*	*2.6*	*7.2*	*9.9*	*2.7*
15) Banking	1.2	2.7	1.5	1.5	3.2	1.7
16) Insurance	1.5	2.4	.9	1.5	2.4	.9
17) Real Estate	1.0	1.0	0	1.0	1.1	.1
18) Engineering	0.4	0.2	- .2	0.6	0.2	- .4
19) Accounting	0.3	0.2	- .1	0.4	0.4	.0
20) Misc. business serv.	1.2	1.4	- .2	1.7	1.9	.2
21) Legal services	0.4	0.6	.2	0.5	0.4	- .1
V. *SOCIAL SERVICES*	*11.9*	*25.9*	*14.0*	*15.2*	*32.9*	*17.7*
22) Medical services	0.9	2.6	1.7	1.0	4.0	3.0
23) Hospitals	1.1	6.2	5.1	1.3	7.6	6.3
24) Education	3.1	10.4	6.3	5.1	14.3	9.2
25) Welfare	0.6	1.4	.8	0.9	1.7	.8
26) Nonprofit	0.3	0.5	.2	0.4	0.5	.1
27) Postal services	1.2	0.4	- .8	1.3	0.5	- .8
28) Government	4.3	4.2	- .1	5.0	4.0	-1.0
29) Misc. social serv.	0.2	0.2	0	0.3	0.3	0
VI. *PERSONAL SERVICES*	*7.4*	*19.8*	*12.4*	*7.0*	*15.0*	*8.0*
30) Domestic services	0.6	8.3	7.7	0.3	4.0	3.7
31) Hotels	0.7	1.6	.9	0.6	1.5	.9
32) Eating & drinking	1.8	5.2	3.4	2.1	5.2	3.1
33) Repair	1.9	0.3	-1.6	1.8	0.4	-1.4
34) Laundry	0.7	1.7	1.0	0.5	1.2	.7
35) Barber & beauty shop	0.5	1.4	.9	0.5	1.6	1.1
36) Entertainment	0.8	0.8	0	0.9	0.8	- .1
37) Misc. personal serv.	0.3	0.5	.2	0.3	0.3	0
TOTAL LABOR FORCE	*100.0*	*100.0*		*100.0*	*100.0*	

The distinctive characteristic of working women is their degree of part-time work. *Dual Careers* (1970) points out that 78 percent of women in the labor force work full-time (over 35 hours a week) while 22 percent work part-time. Black women are more likely to work part-time than white women, mostly because blacks are more likely than whites to be in domestic services. Outside of domestic service, Black women are less likely than whites to work part-time. The amount of part-time work is important for many reasons. First, if women are the main part-time workers in a society then the effects of the characteristic "female" may be confused with the effects of the characteristic "part-time." This discussion will have more relevance later when sex-typing is introduced, but the point is that if women work part-time voluntarily (see *Dual Careers*, 1970), then women automatically will choose *and* be chosen only by those industries that have a need for part-time workers. Hewes (1962) studied women part-time workers and reported that service industries are particularly suited to the employment of part-time workers because these industries have marked fluctuations in business pressure during day or week and unusually long hours of operation. Hewes showed that only 6 percent of manufacturing and 8 percent of agricultural jobs have women in part-time work. Most women employed part-time are in service and private household (29%), wholesale and retail trade (27%), and other services like finance, real estate, entertainment, education, and welfare (26%). Therefore, sex-typing by industry is, *in part*, a result of the need for part-time workers.

The negative effects of part-time work is that if these married women are supplementing the family budget, this may serve to depress or dampen wage or salary scales because of their willingness to accept somewhat lower pay. Salaries and wages are further lowered by the fact that part-time work is usually characterized by high productivity (Bancroft, 1958), so the employer is getting more and paying less. Another consideration is that part-time work usually lacks on-the-job training and, as will be discussed later on, job training increases the marginal product and thus raises wages. Another negative effect is that part-time workers pose a threat to the security of full-time workers because part-time workers do not or cannot unionize to the extent of full-time workers. Last, part-time work must be examined because the effects of part-time employment might be confused with the effects of role-playing. Perhaps the desire to work part-time is a better explanation than role-playing as to why women are secretaries and saleswomen. Yet full-time female workers are also concentrated in services.

For an analysis of the female labor force, the Extractive sector has become insignificant. Mining traditionally had very few females, and agriculture did not employ more than one percent of all economically active females in 1970. Although percentage distributions do not yield information about interindustry movements *per se*, it can be safely assumed that the vast majority of females who were in agriculture in 1970 either had been in that industry in 1960 as well, or were new labor force entrants (see Chapter III).

Among the remaining five industry sectors, the Transformative and Personal service sectors experienced declining shares of female employment during the 1960's, the Social and Producer services sectors increased their shares, and the Distributive services sector remained virtually unchanged (see Table VI-1). Given the concentration of females in the various sectors it comes as no surprise that proportionately less women than men are employed in Transformative industries, and this difference widened further during the last decade. The textile industry, which traditionally has employed a large proportion of females continues to be the only Transformative industry to employ relatively and absolutely more females than males. With the one exception of the machinery industry, however, the share of female employment declined in all industries of the Transformative sector during the 1960-70 period, following the same trend as that for male employment.

The discussion of the heterogeneity of services in the introductory chapter should lead us to expect that not all services are equally female oriented. In both 1960 and 1970 the Distributive services sector employed a larger share of males than of females, and two industries -- transportation and wholesale trade -- account for this difference. Transportation traditionally has been heavily male-oriented, but with the increasing bureaucratization of this industry and its new forms of technology, female employment has become more important, excepting that of vehicle operators. As a result, the share of male employment in this industry declined during the 1960's, while female employment increased. Transportation is not the only industry to experience this kind of change. Probably the most influential reason why female white-collar work has increased so greatly is the increasing paper work involved at every level of society and the employment structure. Both large and small firms need clerical workers in increasing numbers, and they do not hesitate to hire an extra secretary because the additional cost is perceived as small. Most Producer services exemplify this pattern.

Not only did specific service industries increase their proportion of total female employment, shifts also occurred on the sectoral level. In 1970, proportionately fewer females were employed in the Personal services sector than ten years earlier. This relative decline, however, was due almost exclusively to the diminishing role of domestic service, whose share of total female employment dropped from 8.3 percent in 1960 to 4.0 percent in 1970. If domestic service is excluded from the Personal services sector, almost no change in the proportion employed in this sector is observed during the 1960-70 interval (11.2 and 11.0 percent, respectively). Among Personal services, repair is the main industry that employs relatively fewer females than males. But the type of work involved in repair services such as automobile mechanics is traditionally viewed as a male occupation.

The two fastest growing sectors in terms of female employment are clearly Producer and Social services, and it is here where the differences in the proportions of males and females employed are the most pronounced. While some of the Producer services (mostly professional) do employ slightly larger share of males than of females (i.e., engineering and architectural services and legal services), the two most important industries in this sector, banking and financing services and insurance, employ a much larger proportion of females than of males. Since these two Producer services are also the most dynamic ones of this sector, the female share of employment in the Producer services sector is even larger in 1970 than it was in 1960.

By far the most important sector for the employment of females is Social services, which in 1970 accounted for almost one-third of all females in the labor force. Three of its industries alone -- medical and health services, hospitals and education -- employed over one-fourth of all females in 1970, compared with less than one-fifth in 1960. Indeed, with the exception of government, which declined slightly between 1960 and 1970, all other Social services proportionately increased their share of female employment during that period. By 1970 female employment in education for the first time exceeded that in retailing and the gain of almost four percentage points during the 1960 decade is very impressive. Although it is very doubtful that the rate at which employment in these industries has been increasing can be maintained in the present decade -- education, for example, no longer is a "growth" industry -- it nevertheless can be expected that Social services will continue for some time to absorb an increasing share of all female employment.

The concentration of females in services relative to the distribution of males can be demonstrated by comparing the proportion female of the total labor force with the female proportion of employment in each of the 37 industries. The data in Table VI-2 shows that all industries in which females account for a higher employment proportion than they do in the total labor force are service industries, the only exception being textiles. Moreover, among the industries that employ females at a proportion lower than that of the total labor force, only eight were service industries as of 1960, and this dropped to seven in 1970.

While the differences in the employment distribution among industries between males and females are quite important in themselves, they raise the question as to their implications for the occupational distribution of females and the monetary rewards of their economic activities. On the basis of the relationship covered earlier in this report between industries and occupations (see Chapter V), it is expected that females are more highly concentrated in service occupations than are males, for their employment share in service industries is also higher. Moreover, since the great majority of service industries are made up of white-collar occupations, it should be expected that females more than males are concentrated in professional, technical, clerical, and sales occupations. On the other hand, it is anticipated that relatively fewer females than males are farmers, craftswomen, operatives, laborers, and farm workers.

Occupational segregation is cited by Harriet Zellner (1972) as the cause of the earnings differential between men and women. Zellner argues that in 1968 the income of women working full-time year round was 58% of that received by men. Her data reveal that as of 1960 about 50% of all employed women were concentrated in occupations where they represented 80% or more of total employment, while only 2% of men were in such occupations. On the other hand, 20 percent of employed women were in occupations where they represented less than 33% of total employment yet nearly 90% of the employed men were in such occupations. Zellner feels that the preference for males in these masculine occupations shifts the demand curve for women to the left. Demand

Table VI-2

PROPORTION OF THE U.S. LABOR FORCE WITH 12 YEARS OR MORE OF SCHOOLING BY SECTORS AND INDUSTRY GROUPS BY SEX, 1960 AND 1970

Sectors and Industries	1960		1970	
	Males	**Females**	**Males**	**Females**
I. *EXTRACTIVE*	*25.7*	*37.9*	*39.6*	*50.8*
1) Agriculture	26.3	28.2	37.5	45.4
2) Mining	34.4	73.2	48.7	82.5
II. *TRANSFORMATIVE*	*40.7*	*45.8*	*54.4*	*54.5*
3) Construction	33.7	61.2	46.0	76.3
4) Food	36.6	36.2	48.5	46.9
5) Textile	28.9	26.0	39.0	35.4
6) Metal	45.6	52.0	50.6	61.2
7) Machinery	49.5	52.7	63.8	62.0
8) Chemical	56.2	66.4	70.4	71.4
9) Misc. manufacturing	37.8	45.6	53.2	56.5
10) Utilities	44.2	78.0	60.7	86.0
III. *DISTRIBUTIVE SERVICES*	*45.8*	*55.8*	*58.8*	*65.8*
11) Transportation	35.4	64.2	50.6	75.1
12) Communication	74.9	71.2	87.1	84.1
13) Wholesale	54.6	64.0	77.7	73.1
14) Retail	45.5	50.4	55.7	60.9
IV. *PRODUCER SERVICES*	*72.4*	*76.4*	*81.9*	*84.8*
15) Banking	76.0	80.0	86.0	87.0
16) Insurance	79.1	78.2	89.3	86.8
17) Real Estate	50.5	62.0	63.7	73.8
18) Engineering	86.2	84.2	92.2	91.1
19) Accounting	91.6	83.6	96.0	97.2
20) Misc. business serv.	61.8	70.6	72.0	73.6
21) Legal services	95.0	84.6	98.2	90.0
V. *SOCIAL SERVICES*	*66.7*	*75.8*	*77.7*	*80.3*
22) Medical services	85.1	67.7	86.0	69.0
23) Hospitals	51.1	63.3	65.7	72.3
24) Education	76.0	85.5	83.2	87.2
25) Welfare	70.4	59.3	78.9	77.1
26) Nonprofit	52.5	66.3	65.5	76.1
27) Postal services	66.2	61.8	74.3	75.3
28) Government	60.1	78.9	74.5	84.0
29) Misc. social serv.	81.4	88.2	89.3	88.3
VI. *PERSONAL SERVICES*	*34.3*	*27.8*	*45.4*	*40.5*
30) Domestic services	18.6	16.2	19.8	26.2
31) Hotels	37.9	54.3	50.0	44.4
32) Eating & drinking	32.4	29.2	40.8	40.0
33) Repair	33.7	54.7	45.5	65.6
34) Laundry	36.2	25.9	44.1	38.9
35) Barber & beauty shop	31.8	52.1	49.3	65.3
36) Entertainment	41.0	51.2	52.0	60.8
37) Misc. personal serv.	51.7	45.7	68.4	62.9
TOTAL LABOR FORCE	*44.7*	*55.3*	*59.8*	*66.8*

curves, which are usually sloping, show that as the price of an item (or labor) goes down, the quantity demanded rises. Therefore a shift in a demand curve to the left for female labor means that the same quantity of labor can be bought for a lower price. This lowers female employment in masculine occupations. A female dominated sector results from a reduction in demand for women in the masculine sector, which subsequently increases their supply to those occupations in which males are not preferred to females. The results are that since demand is lower in the masculine sector, wages for women are lower, and since supply is increased in the feminine sector, wages for those women are also lower.

Francine Weisskoff (1972) agrees with Zellner's findings. She asserts that occupational segregation is as pervasive now as it was at the turn of the century. Weisskoff pointed out that well over half of all working women in both 1900 and 1960 were employed in jobs in which 70 percent or more of workers were female. She showed that the increased participation of women in the labor force has not been absorbed through an across-the-board expansion of employment opportunities but rather through a growth in traditionally female jobs or through the emergence of new occupations that rapidly became sex typed.

As an explanation of this pattern, Weisskoff explained several institutional factors that favor segregation of the sexes. The family unit with its traditional relationships between men and women socialize people into their respective roles. On the supply side girls are taught to aspire to and train for what are considered to be appropriate female occupations. Frequently, the educational system further intensifies this problem by channeling women into traditional feminine pursuits. The demand side deals with the hesitation of both workers and customers in allowing women to enter "non-feminine" occupations. Many employers are not willing to experiment with female employment in traditionally male occupations, even though new labor legislation (such as the Equal Employment Opportunity Commission's guidelines) have eliminated the most blatant discriminatory hiring practices.

Weisskoff explains the pay differentials between female and male workers in terms of supply and demand in dual labor markets. Demand is greatly restricted by the sex-typing of jobs. The supply of women available for work is highly responsive to changes in the wage rate and employment opportunities in general. Overcrowding in female occupations results in lower earnings for women's jobs.

Eliminating occupational segregation by sex is essential to any kind of economic equality for women. Weisskoff concludes that if women enter the male sector in quantity this will have the additional positive effect of raising incomes of women in predominately female occupations and will in turn attract more men to those female occupations. Nursing is a profession anxious to attract men in order to ease the shortage and to raise wages and working conditions.

On the other hand, Isabel Sawhill (1973) suggested that equal pay legislation may lower the earnings of women because it might increase the crowding in female occupations. If employers in male-dominated occupations cannot hire women for a lower price they may not hire women at all. And, if men cannot be paid a higher price in female-dominated occupations, they might not seek those jobs, all of which would lead to further segregation. Although equal pay laws may guarantee equal wages to women working side by side with men, they tend to reduce the training opportunities available to women which is a major source of sex differential.

Sawhill used Becker's theory of human capital to explain the lower status of women and the segregation in the market place. Becker differentiates between general and on-the-job training. General training (education) is paid for by the worker, and on-the-job training is paid for by the employer. With general training, the worker pays and then collects the return on his investment. Consistent with the firm's goal of optimizing profits, presumably the firm will only pay for training where it can collect on the return. Naturally, the more on-the-job training is required the more desirous a firm is in keeping turnover low. The argument runs that women are not good training investments because of their intermittent labor force participation patterns. They are less likely to receive on-the-job training and thus be able to raise their income. Investment in training of individuals steepens the age-earnings profiles over the life cycle,but since women's participation pattern is best described by a bi-modal life-time curve, their age-earnings profiles are relatively flat. In the case of on-the-job training, the shape of age-earnings profiles depends on the extent to which employers share returns with employees in order to reduce turnover. Certain types of jobs provide a mixture of general and on-the-job training and women generally are confined to those jobs of little or no training. In other words, sex-typing occurs partly because of differences in on-the-job training which is rationalized by saying women have intermittent labor force participation. The only way for women to make up for this lack is more general training which usually comes in the form of increased education.

EDUCATIONAL ATTAINMENT

Table VI-2 shows that on the whole women have a higher proportion of the labor force in each industry with 12 years of schooling or more than do men. In 1960 53.3 percent of all employed females had twelve years of schooling or more, compared with only 44.7 percent of all employed males. This difference was reduced only minimally during the 1960's, the respective 1970 values being 66.0 and 59.2 percent.

The one sector in which the male figure is higher than females is Personal services, and domestic service, laundry and hotels account for this advantage, all three employing women with a low level of education. On the industry level, the marked advantage of males in legal and medical industries is due to the male dominance as lawyers and physicians. Turning to sectors and industries in which females have an educational advantage, we find a marked difference in the Extractive sector and in the industries of mining, construction, utilities, transportation and repair. All of these have a low female representation and they are mainly employed in "front office" jobs as secretaries and clerks, in no way competitive with the men and their generally physical tasks. Education is the only way women can increase their earnings due to their relative lack of on-the-job training which men are more likely to receive. Therefore, for a woman to be hired she must have a higher educational attainment than a man. This condition explains why a women with a B.A. may earn the same as a man with a high school diploma.

This all contributes to the different labor force behavior of men and women. In the past, the fact that women tended to stay out of the labor force for an extended time period during childbearing ages no doubt contributed to the reluctance of employers to give women expansive on-the-job training, although this alone does not explain why women are in inferior positions as compared to men. But as we noted earlier in this chapter, recent changes in the labor force participation of women during their life cycle demonstrate that they are not leaving the labor force during childbearing ages in as great numbers as in the past. In addition, the new labor legislation such as the Equal Employment Opportunity Commission's guidelines and the Affirmative Action Program, at worst, should make discriminatory hiring practices much more difficult, and can be expected to favor increasing equality in the labor market between the sexes. Thus, while there still exists a substantial amount of inequality between the sexes (which often has become more subtle and therefore harder to detect), the nature of recent trends at least have the potential for an improvement in the employment situation of women.

OCCUPATIONAL STATUS

The preceding discussion would lead us to expect substantial differences between males and females in the types of occupations they hold, and these differences are clearly visible in Table VI-3. Even on the level of gross occupational categories, which themselves confound a great deal of internal differentiation, the distribution of females is quite different from that of males. Both in 1960 and in 1970 relatively more females than males were in white-collar occupations with the exception of managerial and semi-professional occupations. The lower share of female employment in managerial occupations is expected since a large part of these positions are in Transformative industries where females are less represented. But since many of the semi-professional occupations are found in Social services (48.8 percent of all persons in this occupational category are employed in Social services), a large share of females had been expected in semi-professional occupations.

In 1960 and 1970 females had a higher concentration in professional occupations than did males, but this difference was reduced during the 1960's This finding, however, needs further explanation. Although generally speaking, professional occupations should be considered as high-status positions, it must be noted that over one-half of all female professionals can be found in education alone. In this industry most professionals are elementary and high school teachers who rank relatively low among professional occupations. Hospitals employ the second largest proportion of female professionals and although a few are doctors, the vast majority are registered nurses. Again, the occupation of nurse ranks far lower (both in status and monetary reward) than that of doctor. Finally, medical and health services, hospitals, and

Table VI-3

PERCENTAGE DISTRIBUTION OF THE U.S. LABOR FORCE BY MAJOR OCCUPATIONAL GROUPS AND SEX, 1960 AND 1970

	1960			1970		
Occupation	Males (1)	Females (2)	Difference (3) =(2)-(1)	Males (1)	Females (2)	Difference (6) =(5)-(4)
Professionals	6.7	10.4	3.7	9.2	11.8	2.6
Semi-professional	4.0	3.4	-0.6	5.2	4.1	-1.1
Farmers	5.8	0.6	-5.2	2.8	0.2	-2.6
Managers	11.1	3.9	-7.2	11.4	3.8	-7.6
Clerical	7.3	31.4	24.1	7.7	35.1	27.4
Sales	7.2	8.3	1.1	7.2	7.3	0.1
Craftspersons	20.5	1.2	-19.3	21.0	1.8	-19.2
Operatives	20.8	16.2	-4.6	19.2	14.2	-5.0
Service workers	6.4	22.7	16.3	8.1	20.3	12.2
Laborers	7.2	0.6	-6.6	6.5	1.0	-5.5
Farm workers	2.9	1.3	-1.6	1.7	0.5	-1.2
Total Labor Force	99.9	100.0	0.1	100.0	100.1	0.1

education combined accounted for nine out of every ten female professionals in 1960, and in 1970 the proportion decreased only minimally to 88.5 percent. It thus is quite clear that although the proportion of females in professional occupations is higher than that of males, females are heavily concentrated in the two traditionally female occupations of teachers and nurses.

Blitz (1974) points out that there have been only modest improvements of the status of women in the professions. The male-dominated professions of law, medicine, architecture, and engineering have opened up slightly to women but remain over 90 percent male. Some occupations have improved greatly, such as editors and reporters where women were 1 percent in 1870 and are now 40 percent in 1970. He asserted that nurses, elementary school teachers and librarians remain female-dominated professions. The conclusion of his study was that women have done well in the professions numerically, but they are still confined to those professions of low status and pay. He further points out that managers and officials in today's society contain a larger proportion of high prestige jobs, and these occupations are virtually closed to women.

The U.S. Census showed little or no change for women in the male dominated professions between 1960 and 1970. John Parrish (1974) noted that the data in the 1970 census largely reflected decisions made prior to 1965-67 by women applicants to professional schools, so he feels that changes made since then need recognition. He points out, for example, that female enrollment in professional schools is much larger now, and that it is reasonable to expect that these women will obtain degrees in the fields of architecture, dentistry, engineering, law, medicine, optometry, pharmacy and veterinary medicine. He maintained that more change has occurred in the last few years than in the previous half century, but nevertheless he acknowledged that even doubling or tripling women's enrollment in male-dominated professions, still would leave their proportion far behind that of men.

Examining the data in Table VI-3 further, it can be seen that the main differences in the occupational distribution between males and females occur primarily among clerical workers, craftpersons, and service workers. Females are much more concentrated in clerical and service occupations while hardly any crafts-workers are female. During the 1960's, the concentration of females in clerical occupations continued, so that by 1970 more than one of every three females in the labor force was a clerical worker.

As much as clerical occupations are identified with females, crafts occupations are associated with males. Among the non-agricultural occupations only the proportion of females who are laborers is smaller than that of females who are engaged in crafts. Moreover, it is noteworthy that the proportions of males and females who are craftspersons changed very little during the decade.

Service occupations are the third major occupational group in which one sex prevails. These occupations account for the second largest proportion of female employment; throughout the 1960's about one of every five females in the labor force was in a service occupation.

While the analysis of the occupational structure is important in its own right, the main concern here is with occupational differences between males and females within industries. Since it has been shown that the occupational structure is not independent from the industry structure, the fact that females are more numerous in service industries certainly explains, at least in part, why proportionately more females than males are service workers. Given the focus of this study, the more important question is: To what extent does the occupational distribution differ by sex within detailed industries? The main objective here is to demonstrate which occupations are sex-typed among the industries. It must be noted, however, that the major occupational groups are not the most desirable categories for such an analysis. As the case of professionals demonstrated earlier, many differences between males and females exist within these major grouping. Whatever the shortcomings of these gross categories, they probably tend to understate rather than overstate the differences. Any observed differences, therefore, should be interpreted as conservative ones.

Each industry must be examined to see if there are any large differences between the number of men and women in a particular occupation. As noted earlier, clerical occupations generally show the largest difference between the percent female and the percent male. The second largest difference is usually found in the category "crafts-workers." Aside from these two occupational categories, there is no single occupational group which reveals sex-typing in all industries. In Personal services, females predominate in "service work." In the Transformative sector, operatives are more likely to be females than males, with the largest gap being 34.5 percentage points in textiles. However, the sex-typing of occupations is industry-specific, for in the chemical and utility industries operatives are 7 and 17 percentage points more males than females, respectively. In the transportation industry men comprise 30 percentage points more of operatives than women. The other industries in the Distributive services, wholesale and retail, both have large gaps between the number of men and women employed in sales. However, what is interesting is that in wholesale, the sales workers are mainly men, while in retail, which is lower paid, sales workers are mainly women.

In the Producer services sector, the occupational differences between males and females vary from one industry to the next. Banking is male-dominant in managers; insurance and real estate are male-dominant in sales workers. As to be expected, engineering, accounting, and legal services have a high concentration of males in professional occupations. In legal services, in 1970, for example, 94.5 percent of total male employment was professional, compared to only 5.3 percent for females. On the other hand, 92.5 percent of all females were in clerical positions, compared to 3.1 percent for males.

The opposite is true of Social services where in medical services, hospitals, and education women predominate as professionals because of their large proportion of nurses and teachers. Welfare has 42 percentage points more men as semi-professionals than women. And lastly, within Personal services females are dominant in the service occupations.

What must be pointed out is that even in many cases where no differences exist between male and females in terms of their occupational distribution the fact remains that individual job categories within occupations are often sex-typed. A restaurant either has waitresses or waiters, rarely both. A factory generally segregates the women operatives from the men operatives. Because of traditional practices, men and women rarely work side by side on an equal basis in equal numbers. The exceptions to this rule would be, for example, reporters and entertainers. Musicians and college professors would not be included because although women might be working side by side with men they are rarely equal in number.

The analysis of sex-typing of occupations among industries, however, must take into account the fact that the female proportion of employment varies greatly from one industry to the next. If 90 percent of employment in industry A is female, a domination of females in most occupational categories within that industry is likely. In this case it would make more sense to refer to a sex-typing of an industry rather than of an occupation. On the other hand, if in industry B females account for 25 percent of total employment yet 90 percent of all clerical workers in that industry is female, then a case could be made for the fact that clerical occupations in industry B are sex-typed. The extent of industry and occupational sex-typing will be examined in the following section.

Sex-typing of industries. If females were distributed among particular industries in the same manner as their distribution within the total labor force, then 37.6 percent of total employment in each industry should be female in 1970 (32.8 percent in 1960), according to our figures from the Public Use One Percent Samples (see Table VI-4). Obviously, this is not the case. While any decision as to what employment proportion constitutes sex-typing is arbitrary, an industry will be labeled female-dominated if females account for at least 15 percentage points more of the industry's employment than they do of the total labor force. Correspondingly, an industry is male-dominated if the female proportion of employment is 15 percentage points less than the female share of the total labor force. Thus, given that in 1960 32.8 percent of the total labor force was female, an industry is female-dominated if females account for more than 47.8 percent of industry employment, and male-oriented if females account for less than 17.8 percent of industry employment. The respective values for 1970 are 52.6 percent for the female-dominated industry and 22.6 for the male-dominated industry.

The data in Table VI-4 show the following industries to be female-dominated (in decreasing order):

Table VI-4

PERCENT FEMALE IN THE TOTAL LABOR FORCE, INDUSTRY SECTORS AND INTERMEDIATE INDUSTRY GROUPS: UNITED STATES, 1960-1970

Sectors and Industries	1960 Percent Female	1960 Rank	1970 Percent Female	1970 Rank
I. *EXTRACTIVE*	*10.0*		*10.0*	
1) Agriculture	10.6	33	10.5	35
2) Mining	6.2	36	7.9	36
II. *TRANSFORMATIVE*	*21.7*		*23.8*	
3) Construction	5.4	37	5.0	37
4) Food	25.0	24	26.5	25
5) Textile	59.6	4	63.8	5
6) Metal	13.4	31	14.2	32
7) Machinery	19.9	27	22.4	27
8) Chemical	18.4	28	21.3	28
9) Misc. manufacturing	24.7	25	28.7	24
10) Utilities	13.6	30	13.2	33
III. *DISTRIBUTIVE SERVICES*	*29.8*		*33.9*	
11) Transportation	9.9	34	14.5	31
12) Communication	51.1	11	48.9	13
13) Wholesale	21.2	26	23.3	26
14) Retail	37.1	17	41.5	17
IV. *PRODUCER SERVICES*	*41.3*		*45.5*	
15) Banking	53.1	9	56.6	10
16) Insurance	44.5	14	49.1	12
17) Real Estate	32.9	20	38.3	20
18) Engineering	16.0	29	16.2	30
19) Accounting	30.5	23	40.2	19
20) Misc. business serv.	36.4	18	40.4	12
21) Legal services	40.4	15	46.7	15
V. *SOCIAL SERVICES*	*51.4*		*56.6*	
22) Medical services	58.9	5	70.1	3
23) Hospitals	73.2	2	77.3	2
24) Education	62.1	3	62.8	6
25) Welfare	44.9	13	52.7	11
26) Nonprofit	45.6	12	46.8	14
27) Postal services	13.0	32	20.2	29
28) Government	32.0	22	32.8	23
29) Misc. social serv.	34.8	19	37.8	21
VI. *PERSONAL SERVICES*	*56.5*		*56.5*	
30) Domestic services	87.1	1	90.1	1
31) Hotels	51.9	10	58.9	9
32) Eating & drinking	57.8	6	59.3	8
33) Repair	6.7	35	11.4	34
34) Laundry	54.8	8	60.6	7
35) Barber & beauty shop	55.5	7	67.6	4
36) Entertainment	32.3	21	35.1	22
37) Misc. personal serv.	30.6	16	42.9	16
TOTAL LABOR FORCE	*32.8*		*37.8*	

1960		1970	
Domestic service	54.3	Domestic service	52.5
Hospital	40.4	Hospital	39.7
Education	29.3	Medical Services	32.5
Textiles	26.8	Barber and beauty shops	30.0
Medical services	26.1	Textiles	26.2
Eating and drinking places	25.0	Education	25.2
Barber and beauty shops	22.7	Laundry & dyeing services	23.0
Laundry & dyeing services	22.0	Eating & drinking places	21.7
Banking and financing	20.3	Hotel and lodging places	21.3
Hotel and lodging places	19.1	Banking and financing	19.0
Communication	18.3	Welfare & religious services	15.1

(The numbers refer to the difference between the percent female in the total labor force and the percent female in the particular industry. In 1970, for example, 37.6 percent of the total labor force was female, yet females accounted for 90.1 percent of total employment in domestic service). With the two exceptions of communication and welfare and religious services, each the lowest ranking in 1960 and 1970, the industries that were female-dominated in 1960 remained that way in 1970. Except for textiles, all female-dominated industries are services of one kind or another, but most of them belong to the Social services and Personal services sectors. Not surprisingly, domestic service is the most female-dominated industry; females make up 90 percent of total employment. Domestic service clearly is the example that first comes to mind when talking about a female-dominated industry. Next to domestic service in terms of female-domination are hospitals; although the proportion female is lower than in domestic service, hospitals are a much more rapidly growing industry which makes the difference in the sex composition of employment more significant than that in domestic service, which has been steadily declining. Females account for about three-fourths of total hospital employment. Again, females traditionally have been employed in medical positions, and the continued employment of women as nurses and other health personnel only continues an earlier trend. Although the remaining industries listed above are quite sex-typed as well, none of them reaches the degree of female domination that characterizes domestic services or hospitals. The extent to which employed females are subject to sex-typing by industries is revealed by the fact that about one-half of all females in the labor force are employed in a female-dominated industry. The trend during the 1960's showed further that this concentration is on the increase.

The industries that are male-dominated, i.e. in which the percent female of total employment is at least 15 percentage points lower than the percent female of the total labor force, are found among all industry sectors, but most of them belong to the Extractive and the Transformative sectors. The data in Table VI-4 permit us to determine which industries are male dominated and these are listed below (in decreasing order of male domination:)

1960		1970	
Construction	-27.4	Construction	-31.6
Mining	-26.6	Mining	-29.7
Repair services	-26.1	Agriculture	-27.1
Transportation	-22.9	Repair services	-26.2
Agriculture	-22.2	Utilities	-24.4
Postal service	-19.8	Metal	-23.4
Metal	-19.4	Transportation	-23.1
Utilities	-19.2	Engineering	-21.4
Engineering	-16.8	Postal service	-17.4
		Chemical	-16.3
		Machinery	-15.2

(The number, again, refer to the difference between the percent female of the total labor force and the percent female in each particular industry). Corresponding to the case of female-dominated industries, the two most pronounced male-dominated industries can be regarded as typical male industries, namely construction and mining. Most jobs in these two industries require physical strength, are often dirty, and are somewhat hazardous, all of which are characteristics that traditionally have been ascribed to male work. Most other male-dominated industries could be similarly characterized. Among them, however, are industries where the sex-typing is much less interpretable than it might have been in the remaining industries. Consider postal service, for example. Why are females excluded from this industry, even though over 80 percent of employment is classified as clerical workers, which in every other industry is female-dominated? It is true that being a postman is not the same kind of job as sitting at a desk doing strictly clerical work, but now that nearly all mail is delivered by motor vehicle or by cart, it is not a physically demanding job.

Even if it is accepted that the nature of construction work and of the other male-dominated industries does not suit females (which one might very well choose to reject since this implies assumptions about the work capacity of women that is based more on social conventions than on biological facts), the increasing use of capital equipment in construction and in many other industries and the related trend towards the creation of operative positions should provide more job opportunities for females in male-dominated industries. As the figures in Table VI-4 and on the prior page indiate, however, the exclusion of females from male-oriented industries has increased rather than decreased.

As was previously mentioned, an interdependence exists between the industry structure and the occupational structure. Although we said earlier that logically the industry comes first in determining positions within the labor force, the occupational structure nevertheless is quite important for the analysis of the female labor force participation. On the one hand, industries "mediate" between the structure of production and the occupational labor supply, i.e. an agricultural economy requires less sales workers than would any other form of economic organization. Yet on the other hand, it is up to the employer whom to select for what positions. While it may be that in order to perform construction tasks it is desirable to have a certain proportion of total employment as craftsworkers, this still leaves the employer with a choice as to whom he considers best qualified for those positions. Moreover, in some cases such as in education, the supply of female teachers is clearly larger than that of male teachers, and the reasons for a larger proportion of females therefore must be seen within the training context itself. For various reasons, fewer males choose education as a major field in college than do females.

If employers systematically recruit women for clerical and service occupations, and not for managerial and crafts occupations, we should then expect to find relatively fewer females in industries where crafts and managerial occupations prevail. Conversely, we would expect relatively more females in industries where clerical and service occupations dominate. For purposes of analysis, we therefore assume that the percent female in each of the eleven major occupational groups is the same in every industry as it is in the total labor force (see Table VI-5). These data clearly demonstrate that females are employed in quite different occupations than males, as was pointed out in the previous section. Although in 1970 females accounted for only 37.6 percent of the total labor force, about three-fourths of all clerical workers are females. On the other hand, females are virtually excluded from crafts occupations. By assuming no differences in occupational sex-typing among industries, we can examine the extent to which some industries are more sex-typed than others.

Following this assumption, the expected percent female in each industry can be computed by taking the inter-industry differences in the occupational structure into account. The following formula is used for that computation:

$$\hat{PF}_i = \sum_{d=1}^{11} (PF_j \times N_{ji} / 100) / (N_i)$$

where $\hat{PF}_i$ is the expected percent female in the ith industry, PF_j is the percent female in the jth occupation of the total labor force, N_{ji} is the total number of persons in the jth occupation within the ith industry, and N_i is the total employment in the ith industry. Illustratively, the data in Table VI-6 show that in 1970 38.0 percent of all salesworkers were females. Since there were 28,638 salesworkers in retail trade (according to the 1/100 Public Use Sample) we would expect 28,638 x .38 = 10,882 females to be sales workers in retail trade. Summing these expected values for all eleven occupations in retail trade gives us the expected number of females in that industry. Dividing this sum by the total number of persons employed in retail trade gives us the expected percent female. A comparison of the expected with the actual percent female permits us to assess the extent to which sex-typing of females varies among industries. If the difference is greater than an absolute value of 10 percent, the industry is considered to be sex-typed. Female-dominated

Table VI-5

PERCENT FEMALE IN MAJOR OCCUPATIONAL GROUPS: UNITED STATES, 1960-1970

Occupation	1960	1970
Professionals	42.2	43.5
Semi-professionals	29.4	32.6
Farmers	4.6	4.4
Managers	14.6	16.6
Clerical workers	67.4	73.5
Sales workers	35.7	38.0
Craftspersons	2.8	4.9
Operatives	27.3	30.9
Service workers	62.9	60.2
Laborers	3.6	8.4
Farm workers	17.6	14.8
Total Labor Force	32.8	37.6

is the term applied to those industries with a positive difference of more than 10 percentage points, and male-dominated is applied to those industries with a negative difference of more than 10 percentage points.

The 1960 data in Table VI-6 indicate the following industries to be sex-typed:

1960

female dominated	
Domestic	33.1
Textiles	31.2
Hospitals	26.9
Laundry	26.2
Medical	23.7
Education	19.5
Communication	11.4
Misc. personal ser.	11.4

male dominated	
Postal	-44.5
Engineering	-20.8
Mining	-18.3
Transportation	-16.9
Accounting	-15.7
Utilities	-13.1
Wholesale	-10.7
Government	-10.1
Chemicals	-10.1

1970

female dominated	
Domestic	33.6
Textiles	32.5
Laundry	30.3
Hospitals	26.1
Medical	18.5
Education	15.2

male dominated	
Postal	-44.7
Engineering	-24.6
Transportation	-22.7
Mining	-20.2
Utilities	-14.6
Wholesale	-13.2
Real Estate	-12.5
Chemicals	-12.3
Accounting	-11.8
Government	-11.0

In 1960 there are eight female dominated and nine male dominated industries. For the most part these are the same industries that were classified in Table VI-4 as sex-typed without taking the occupational structure into account. Table VI-6 is a measurement of the industry effect on sex-typing, whereas Table VI-4 measurement of the combined effects of occupation and industry on sex-typing. The difference between the actual and expected number of females shows how much industry itself contributes to sex-typing. The smaller the difference, the less sex-typed the industry is. If the difference is positive then there are more females than would be expected, and if the difference is negative, there are fewer females than expected.

Comparing Tables VI-6 and VI-4 in terms of female-dominated industries in 1960, it can be seen that miscellaneous personal services have a higher proportion of female employment than was expected, whereas eating and drinking places, barber and beauty shops, banking and financing, and hotels and lodging places do not employ more females than should have been expected on the basis of their occupational structure. Thus, given the fact that females are

Table VI-6

EXPECTED AND ACTUAL PROPORTION FEMALE BY SECTORS, AND INDUSTRIES 1960-1970

Sectors and Industries	1960 Ex-pected	1960 Actual	1960 Differ-ence	1970 Ex-pected	1970 Actual	1970 Differ-ence
I. EXTRACTIVE	*12.2*	*10.0*	*-2.2*	*15.4*	*10.0*	*-5.4*
1) Agriculture	10.4	10.6	.2	11.6	10.5	-1.1
2) Mining	24.5	6.2	-18.3	28.1	7.9	-20.2
II. TRANSFORMATIVE	*15.5*	*21.7*	*6.2*	*27.9*	*23.8*	*-4.1*
3) Construction	10.9	5.4	-5.5	13.0	6.0	-7.0
4) Food	25.3	25.1	- .2	30.3	26.5	-3.8
5) Textile	26.5	59.6	33.1	31.3	63.8	32.5
6) Metal	23.0	13.4	-9.6	27.6	14.2	-13.4
7) Machinery	21.9	19.9	-2.0	30.2	22.4	-7.8
8) Chemical	28.5	18.4	-10.1	33.6	21.3	-12.3
9) Misc. manufacturing	24.8	24.6	- .2	30.5	28.7	-1.8
10) Utilities	26.7	13.6	-13.1	27.8	13.2	-14.6
III. DISTRIBUTIVE SERVICES	*27.8*	*29.8*	*2.0*	*35.9*	*33.9*	*-2.0*
11) Transportation	26.8	9.9	-16.9	37.2	14.5	-22.7
12) Communication	39.7	51.1	11.4	43.8	48.9	5.1
13) Wholesale	31.9	21.2	-10.7	36.5	23.3	-13.2
14) Retail	30.1	37.1	7.0	35.6	41.5	5.9
IV. PRODUCER SERVICES	*43.6*	*41.3*	*-2.3*	*50.3*	*45.5*	*-4.8*
15) Banking	48.6	53.1	4.5	55.6	56.6	1.0
16) Insurance	46.0	44.5	1.5	53.7	49.1	-4.6
17) Real Estate	35.8	32.9	-2.9	50.8	38.3	-12.5
18) Engineering	36.8	16.0	-20.8	40.8	16.2	-24.6
19) Accounting	46.2	30.5	-15.7	52.0	40.2	-11.8
20) Misc. business serv.	38.7	36.4	-2.3	45.6	40.4	-5.2
21) Legal services	49.6	40.4	-9.2	56.6	46.7	-9.9
V. SOCIAL SERVICES	*45.2*	*51.4*	*6.2*	*49.2*	*56.6*	*7.4*
22) Medical services	46.4	70.1	23.7	51.6	70.1	18.5
23) Hospitals	46.3	73.2	26.9	51.2	77.3	26.1
24) Education	42.6	62.1	19.5	47.6	62.8	15.2
25) Welfare	39.6	44.9	5.3	45.5	52.7	7.2
26) Nonprofit	44.0	45.6	1.6	45.8	46.8	1.0
27) Postal services	55.5	13.0	-42.5	64.9	20.2	-44.7
28) Government	42.8	32.0	-10.8	43.8	32.8	-11.0
29) Misc. social serv.	35.2	34.8	- .4	41.4	37.8	-3.6
VI. PERSONAL SERVICES	*43.9*	*56.5*	*12.6*	*47.1*	*56.5*	*9.4*
30) Domestic services	55.9	87.1	31.2	56.5	90.1	33.6
31) Hotels	45.3	51.9	6.6	51.8	58.9	7.1
32) Eating & drinking	50.9	57.8	6.9	54.1	59.3	5.2
33) Repair	12.0	6.7	-5.3	17.8	11.4	-6.4
34) Laundry	28.6	54.8	26.2	36.3	60.6	30.3
35) Barber & beauty shop	58.2	55.5	-2.7	60.0	67.6	7.6
36) Entertainment	37.3	32.3	-5.0	41.6	35.1	-6.5
37) Misc. personal serv.	28.2	39.6	11.4	33.5	42.9	9.4

overrepresented in service occupations, their shares of employment in the latter three Personal services was within the expected range. Similarly, as clerical work accounts for a large proportion of employment in banking and financing, and as clerical occupations are clearly female-oriented, the employment share of females in banking and financing was to be expected as well.

Concerning males, the differences between industries in Tables VI-4 and VI-6 are somewhat larger. Construction, agriculture, repair services, and metal industries are not listed as male-dominated industries in Table VI-6, but they appear in Table VI-4. Given the occupational structure of these industries, women are represented in the expected number, which is low. Industries like postal services, engineering, mining, and transportation are classified as sex-typed in both tables. Accounting, utilities, wholesale, government and chemical industries are added to Table VI-6. Given the occupational structure of these industries, women are underrepresented.

In 1970 the only changes in Table VI-6 for female dominated industries are that miscellaneous personal services and communication are not present, and real estate is added as a male-oriented industry. These changes are reflective of the fact that during the 1960-70 period the differences between the expected and the actual employment of females in female-oriented industries declined, whereas the differences generally widened for male-oriented industries. The exceptions are: accounting, which was male-dominated both in 1960 and 1970 but less so in 1970; welfare, which was female-dominated in 1960 and 1970 but more so in 1970; and various Personal services (domestic service, hotel and lodging places, laundry services, and barber and beauty shops) which became more female-oriented in 1970. Aside from these industries all other industries either became less female-oriented or more male-oriented. The reasons for this lies partially in the fact that as a result of the increasing labor force participation of women between 1960 and 1970 women gained proportionately in every occupational category except for service work and farm work (see Table VI-5). These gains raised the expected share of female employment in each industry (Table VI-6) and therefore lowered the difference between the expected and the actual employment as far as female-dominated industries are concerned. What is significant is the fact that in those industries where females already were underrepresented in 1960, the employment changes during the 1960-70 period further widened the gap between the number of women expected and the actual number of women.

While industries in which the actual percent female differed from the expected percent female by no more than ten percentage points were not considered to be sex-typed, this may have been the result of the fact that in some occupations within a particular industry, females made up a significantly larger proportion of employment than would have been expected, but that this overrepresentation was cancelled out by the effects of female underrepresentation in other occupations within that same industry. This possibility is examined in the following section.

The best example of this phenomenon is legal services. The difference between the actual and the expected in the legal industry is -9.2 in 1960, and -9.9 in 1970. But women comprise 92 percent and 93 percent in 1960 and 1970, respectively, of clerical workers in this industry, whereas men account for 93 percent and 95 percent in 1960 and 1970, respectively, of professionals in this industry. This is the most extreme case of sex-typing which is not evident in Table VI-6 because the overrepresentation of women in clerical work and their underrepresentation in professional positions cancelled each other out. This also occurred in insurance, which has an underrepresentation of clerical workers and an overrepresentation of male sales workers.

Table VI-6 sorts out the industry sex-typing from the occupational sex-typing. Occupational sex-typing is less easy to correct because men and women still have occupational roles that they fall into and train for. Industry sex-typing should be easier to eradicate, because it only involves shifting already trained personnel to different industries.

The growing domination of services has the potential of affecting women more than any other group of the labor force. One of the prime characteristics of a "service economy" is the move away from physical work, which is illustrated by the increase of white-collar jobs. Yet women are not equally distributed in the labor force even in white collar jobs due to role differentiation and their intermittent labor force participation patterns that limits human capital investments, especially over the length of the work life cycle. If one assumes that at birth the mental capabilities of men and women are equal, then it is only role prejudice (which also accounts for the bi-model participation curve) that prevents an equal distribution of men and women in most jobs, occupations, industries, and sectors. Role prejudice occurs when there are genetic differences in the population which are visible but not necessarily significant for role performance. Kenneth E. Boulding (1973: 252) addressed this question in a beautiful analogy of the genetic differences between blood types and the genetic differences between sexes. He stated,

> In ordinary life we are quite unaware of a person's blood type. Consequently, it can be safely assumed that there are no role prejudices against blood types of different kinds unless these happen to be associated with other characteristics which are socially visible. For the major types, this association is fairly minimal. Consequently, we would be very surprised to find a distribution of blood types in any occupational group or income group of any size which is markedly different from the distribution of blood types in the population as a whole.
>
> The genetic division of the human race into men and women qualifies in most societies as the major form both of discrimination in the existing labor force and of role prejudice. This is not surprising as the genetic difference between sexes is far greater than it is among races in terms of the structure of information of the genetic

> code. There is one role indeed - that of bearing children - in which there is 100 percent genetic specialization between the sexes, in the sense that no men will be found in the childbearing population. The very social visibility of the distinction between the sexes, however, makes it a prime candidate for role prejudice which creates a huge reservoir of false knowledge, false education, and false learnings processes ...

In the past, the physical requirements of work, concommitant with the sex-role differentiation, has often been cited as contributing to the division of labor by sex. In a service society, however, work by and large has lost most of its physical characteristics. (This is not to say that work is no longer strenuous; certainly, eight hours at a typewriter does result in physical exhaustion. But this stress derives from factors other than the physical requirements of pressing down typewriter keys.) In that sense, the service society provides at least the opportunity for men and women to work in comparable positions. The remaining division of labor by sex in a service society, therefore, must largely be examined within the framework of sex-role differences.

Chapter VII

THE SECTOR AND INDUSTRY POSITION OF MINORITIES

As is the case with sexual differences, throughout this report there has been presented data on the sectoral and industry changes of blacks, but the references have been in passing, so to speak. In this chapter attention will be focused on the blacks and their position vis-à-vis the whites. To a lesser extent the Mexican-American population of the Southwest will be considered, it representing the second largest minority in the U.S.A. The contrast between the two minorities is instructive, for while they both are much below the whites on socioeconomic criteria, they demonstrate some important differences, e.g., the problem of language for the Mexican-Americans. First, however, we turn our attention to black-white differences.

BLACKS IN THE LABOR FORCE

After the early emphasis in black studies on the family structure [e.g., DuBois, 1970(1909); Frazier, 1939], Myrdal's An American Dilemma set the stage for investigations dealing with a wide range of social and economic characteristics of the black population (Pettigrew, 1964; Glenn, 1969; Price, 1969). Most of these studies noted that blacks had gained in many respects, be it income, education, or occupational status. As pointed out by Glenn (1969), however, much of this progress was rather moderate and did not serve to reduce much of the gap existing between whites and blacks in these characteristics. Furthermore, in some respects the status of blacks relative to whites even declined. The ratio of nonwhite to white infant mortality (age one month to one year), for example, increased from 2.30 in 1950 to 2.76 in 1965 (Glenn, 1969:52). It thus is the consensus of most of the literature about blacks that the post-war changes did improve the socioeconomic position of blacks, but that these improvements did not substantially narrow the difference between whites and blacks along these dimensions.

The various civil rights legislation during the 1960's raised expectations that at last the relative position of blacks would improve to the point where the differences between whites and blacks would be substantially reduced. In a recent assessment of these changes Farley and Hermalin (1972) asked the question whether or not the 1960's had been a decade of progress for blacks. They concluded that the last decade did indeed improve the position of blacks: their incidence of poverty was lower in 1970 than in 1960, they had higher educational attainment and occupied better positions in the labor force. But they also noted substantial differences between various groups of blacks. The socioeconomic improvement was better for younger than for older blacks and females did much better than males relative to whites. On the other hand, Farley and Hermalin pointed out that blacks are still behind the status of whites. Even in 1970, for example, only 13 percent of all black males were employed in professional and managerial occupations, compared to 23 percent of white males in 1960, ten years earlier. Similar though slightly smaller differences can be observed for white and black females (Farley and Hermalin, 1972: 363). Again, young blacks did much better than older ones in regard to occupational status. In sum, although the improvements of blacks, particularly of black females, are clearly visible, they have not been achieved uniformly for all blacks.

One reflection of improving social conditions is educational attainment, and this of course will affect young people more than old people. In that sense, young minority members can be expected to fare relatively better than the older generations. As was recently pointed out by Poston et al., (forthcoming), however, there is a possibility that the relatively better position of the younger members of minorities worsens as they grow older. The reason for this is that whites are more likely to be in positions that are in career lines than minorities. In other words, while whites and minorities might start out at similar levels (although not even that situation exists as yet), the career advancement of young whites is more rapid than those of young blacks or Mexican-Americans. Thus, only through longitudinal studies can it be shown whether or not the apparent favorable positions of young blacks can be maintained over time.

It is the purpose of this chapter to shed additional light on the position of blacks in the labor force by concentrating on their distribution among industries. Consistent with the emphasis throughout this study on the relationship between the sectoral transformation of the labor force and various employment characteristics, this part of the study addresses the question of whether or not the position of blacks relative to whites has been affected by changes in the industry structure and what, if any, differences exist between industries with respect to the employment of blacks.

Before entering that analysis, a further differentiation must be made. The findings of the preceding chapter pointed to rather remarkable differences between males and females in the way they are employed in different industries. It was shown, for example, that females are much more heavily concentrated in service industries than males. In addition, females maintain quite different occupations. As black females have a much higher labor force participation rate than white females (the percent female among the black labor force was 45.1 percent in 1970 as compared to 37.0 percent for the white labor force), the different female labor force rates are likely to account for part of the differences in the employment patterns of blacks and whites. A comparison of them therefore must consider differentiation by sex. For these reasons the following analyses will be carried out for males and females separately.

Industry Position

Males. Table VII-1 indicates important differences in the sector and industry distribution of black and white males, particularly in the Producer and Personal services among sectors, and agriculture, machinery, and domestic service among industries for the 1960 period. However, what is most striking in Table VII-1 is the convergence indicated for the 1960-1970 period. Among the six sectors, only Social services showed a slight widening; the other five demonstrated convergence. The industries show more variation, but in nearly every case where there is a widening, it is the black proportion of total labor force that is greater than the white. This general convergence in the industry distribution of employment largely has been the result of changes in the industry allocation of black males, for the white distribution, except for the Extractive and Social services sector, is little changes throughout the decade.

Table VII-1

PERCENTAGE DISTRIBUTION OF THE MALE LABOR FORCE BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRY GROUPS, AND ETHNIC STATUS: UNITED STATES, 1960 AND 1970

Sectors and Industries	1960		1970	
	White	Black	White	Black
I. *EXTRACTIVE*	*10.1*	*13.5*	*6.4*	*5.9*
1) Agriculture	8.6	13.1	5.1	5.3
2) Mining	1.5	0.4	1.3	0.6
II. *TRANSFORMATIVE*	*41.9*	*37.8*	*40.5*	*42.6*
3) Construction	8.6	9.3	8.7	8.9
4) Food	3.3	3.8	2.3	3.2
5) Textile	2.1	1.8	1.7	2.5
6) Metal	4.6	4.8	4.4	5.6
7) Machinery	10.0	5.5	10.6	8.9
8) Chemical	2.3	1.6	2.1	1.8
9) Misc. manufacturing	9.0	9.0	8.8	9.3
10) Utilities	1.8	2.0	1.9	2.4
III. *DISTRIBUTIVE SERVICES*	*23.3*	*18.8*	*24.0*	*20.1*
11) Transportation	6.0	6.3	5.2	6.3
12) Communication	1.0	0.2	1.3	0.6
13) Wholesale	4.3	3.3	5.1	4.2
14) Retail	12.0	8.8	12.3	9.0
IV. *PRODUCER SERVICES*	*6.2*	*3.0*	*7.5*	*4.5*
15) Banking	1.3	0.4	1.6	0.9
16) Insurance	1.6	0.4	1.6	0.5
17) Real Estate	1.0	1.2	1.0	1.2
18) Engineering	0.4	0.1	0.6	0.1
19) Accounting	0.3	0.0	0.4	0.1
20) Misc. business serv.	0.2	0.8	1.7	1.6
21) Legal services	0.4	0.1	0.5	0.1
V. *SOCIAL SERVICES*	*11.7*	*13.6*	*15.0*	*17.5*
22) Medical services	0.9	0.4	1.0	0.6
23) Hospitals	0.9	2.6	1.2	2.9
24) Education	3.1	3.1	5.1	5.0
25) Welfare	0.8	0.8	0.9	1.1
26) Nonprofit	0.3	0.3	0.4	0.3
27) Postal services	1.1	2.1	1.1	2.6
28) Government	4.3	4.2	4.9	4.9
29) Misc. social serv.	0.2	0.1	0.3	0.1
VI. *PERSONAL SERVICES*	*6.6*	*13.2*	*6.6*	*8.8*
30) Domestic services	0.3	3.1	0.2	1.1
31) Hotels	0.6	1.4	0.5	1.0
32) Eating and drinking	1.7	2.7	2.0	2.3
33) Repair	1.9	1.9	1.8	1.7
34) Laundry	0.5	1.5	0.4	0.9
35) Barber & beauty shop	0.5	0.7	0.4	0.5
36) Entertainment	0.8	1.2	0.8	0.9
37) Misc. personal serv.	0.3	0.5	0.3	0.3
TOTAL LABOR FORCE	*99.8*	*100.0*	*99.8*	*99.3*

Part of the change in the distribution of black males by industry during the 1960's is related to their increased urbanization. In 1960, 72.4 percent of the nonwhite population was urban and this increased to 81.3 percent in 1970. (Although "nonwhite" is not identical with "black", blacks account for over 85 percent of all nonwhites). As a consequence of this trend, their share of employment in agriculture declined by over 55 percent during the 1960-70 period. By 1970 agriculture, therefore, ceased to be an important industry for the employment of black males.

As is the case for the total labor force, mining in the recent past has not accounted for much employment among black males, but it is interesting to note that although the proportion of white males in this industry has steadily declined during the last 50 years, the proportion of black males in mining has slightly increased during the 1960's. It might well be that this situation results from the fact that blacks in mining were greatly underrepresented in the past. Thus the current trend could be interpreted to indicate a more similar employment pattern of white and black males in this industry.

The other industry sector in which the share of employment for black males declined during the 1960's are Personal services. This decline is the more remarkable as all Personal services shared in the proportionate decline. In contrast, white employment in this sector increased as much as the total white male labor force; as a result, their share in Personal services remained stable during the last decade.

It is primarily the decline of the proportionate employment of black males in the Extractive and the Personal services sectors which made the industry composition of black employment more similar to that of white males.

The third major change in the industry composition of black males was the expansion of employment in Transformative industries. Although proportionate employment of black males did decline in construction and food industries, the gains in the remaining industries in their sector more than offset those declines. Particularly noteworthy is the increase of blacks in machinery industries, which include transportation equipment. These industries, especially the automobile industry, have a relatively high wage scale which makes the expansion of black employment in this industry even more significant. The increases in the share of employment in Transformative industries for black males is particularly noteworthy in light of the fact that employment of white males in these industries, especially in food and textiles, declined. As a result, black males for the first time in 1970 were relatively more numerous in the Transformative sector than were white males. Given the overall trend of the labor force to move toward service industries, however, it can be expected that the proportion of black males in Transformative industries will not increase much more.

The remaining three industry sectors--Distributive, Producer, and Social services--are characterized by similar employment trends of black and white males during the 1960-70 decade.

Black males are employed in relatively smaller proportions in Distributive services than white males, and the difference between the shares of employment for black and white males has not changed much during the 1960's. Particularly noteworthy is the low proportion of black males in retailing, as compared to white males. Throughout the 1960's, the share of black males in this industry was three percentage points (or about one-fourth) lower than the corresponding share for white males. This finding seems puzzling. If we assume that due to lower educational attainment, black males are more likely to be found in industries that require relatively few skills and provide low wages, a relatively large share of blacks should have been expected in retailing, for the skill requirements in this industry are lower than in many Transformative industries. Thus, the underrepresentation of black males in retailing is unexpected. But it is possible to argue that although most jobs in retailing are relatively low-status positions, employers might not prefer blacks because of the direct face-to-face contact with the customer that is required in this industry. And in those places where both races are hired there is a division of labor. In restaurants and cafeterias, for example, blacks are much more likely to work in the kitchen and clearing tables, whereas whites are more likely to be taking orders and serving. The same pattern will be encountered for black females, lending support to the argument that discrimination is an important factor.

The industry sector from which black males are still excluded to a large extent is Producer services. Although for the entire sector the difference between white and black males in the respective shares of employment was only 2.9 percentage points in 1970 (down 0.3 percentage points from 1960), this difference is quite significant given the small size of this sector. In other words, the proportion of all black males in the Producer services sector was 38 percent smaller than the white share in 1970. This underrepresentation of black males is the more remarkable as it concerns all Producer services, except real estate. Although the data in Table VII-1 show that blacks did make relative gains in this sector during the 1960's their relative proportion in engineering and architectural services, accounting and bookkeeping, and legal services still is only one-fourth or less the proportion of whites in 1970.

The situation in the Producer services sector, however, is interesting in many respects. Although even in 1970 relatively few black males are employed in this sector, they doubled their proportion in banking and miscellaneous business services during the 1960's. It seems reasonable to assume that part of these changes are indeed due to legislation such as the Equal Opportunity Employment Act. Furthermore, and perhaps even more important, many banks and advertising agencies discovered the consumption potential of blacks during the 1960's and therefore were eager to employ blacks--if only on a token basis--in order to gain entry into this market. Engineering and legal services, on the other hand, due to their high proportion of professionals, were less likely to increase their proportion of black employment, for this is partly dependent upon a concomittant increase of blacks in professional education, such as law schools and science departments. As blacks have entered these fields in larger numbers during the recent years, they should account for a much larger share of employment in these services in 1980.

Finally, black males continued to have a larger share of employment in Social services than white males during the 1960-70 period. But this difference is somewhat misleading as it results from just two industries: hospitals and postal services. The occupational status gap is much greater for hospitals, where blacks generally have menial tasks, as compared to postal services, where there is not so great a social differentiation. With the only exception of medical services, in which blacks are less represented than whites (for similar reasons as in the case of Producer services), the other Social services show a remarkable similarity in terms of their shares of employment of black and white males.

Females. In contrast to the increasing similarity of industry composition of white and black male employment, much greater variation still exists between white females and black females (see Table VII-2). In 1960 this was largely due to the enormously high proportion of black women in Personal services. At that time this one sector accounted for over one-half of all black females in the labor force! In comparison, only 15.2 percent of white females worked in this sector. Most of the differences were accounted for by domestic service which employed over one-third (37.5 percent) of all black females, in contrast to only 4.3 percent of white females. Indeed, if this industry is excluded from the Personal services sector, the difference in the relative proportions of black and white employment is very small. Despite this large concentration of black females in domestic service, their share of employment in Social services for 1960 was not much smaller than the corresponding proportion for white females in this sector. Within Social services, black females were most underrepresented in education. Another interesting difference is that white women proportionately were more numerous than blacks in medical services, while the reverse was true in hospitals. Since medical services are mostly private whereas hospitals are usually public (or at least non-profit), it appears that black females find it easier to get employment in larger bureaucracies than in the smaller offices of private physicians or dentists. Furthermore, as in large organizations such as hospitals, a substantial part of employment involves low-status occupations such as orderlies, nurses' aides, and cleaning personnel, all of which largely have been occupied by blacks in the past. Thus, the difference between medical services and hospitals in terms of white and black female employment is not all that surprising.

With the exception of the Extractive sector where the share of employment of black females is somewhat larger than the corresponding share for white females (although this sector is so small that it does not account for much of the difference in the industry composition of black and white employment), great differences exist in the remaining sectors. In the Transformative sector in 1960, the ratio of the share of employment of white females to the share of black females was two; it was three in Distributive services and four in Producer services. In these three sectors, no individual industry showed a smaller relative proportion for white females than for black females, with the sole exception of real estate. The differences are particularly noteworthy in Producer services: proportionately the total sector employed four times as many white females as black females, but banking and financing accounted for ten times as many whites as blacks, and legal services six times as many. This discrepancy is probably the most remarkable one, as most of these services are industries whose employment expanded only relatively recently.

Table VII-2

PERCENTAGE DISTRIBUTION OF THE FEMALE LABOR FORCE BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRY GROUP, AND ETHNIC STATUS: UNITED STATES, 1960-70

Sectors and Industries	1960		1970	
	White	Black	White	Black
I. *EXTRACTIVE*	*2.1*	*4.0*	*1.1*	*1.2*
1) Agriculture	1.9	4.0	0.9	1.2
2) Mining	0.2	0.0	0.2	0.0
II. *TRANSFORMATIVE*	*25.2*	*11.6*	*21.3*	*16.2*
3) Construction	1.0	0.7	1.0	0.4
4) Food	2.3	1.9	1.3	1.6
5) Textile	6.6	3.3	5.0	4.9
6) Metal	1.6	0.7	1.3	0.7
7) Machinery	5.3	1.6	5.1	3.5
8) Chemical	1.1	0.3	1.0	0.6
9) Misc. manufacturing	6.5	2.8	6.1	4.0
10) Utilities	0.6	0.2	0.5	0.3
III. *DISTRIBUTIVE SERVICES*	*21.6*	*7.3*	*21.4*	*10.6*
11) Transportation	1.4	0.7	1.6	0.9
12) Communication	2.3	0.5	2.0	1.9
13) Wholesale	2.5	0.9	2.7	1.2
14) Retail	15.4	5.1	15.2	6.7
IV. *PRODUCER SERVICES*	*9.3*	*2.3*	*10.5*	*5.2*
15) Banking	3.0	0.3	3.4	1.[illegible]
16) Insurance	2.7	0.4	2.5	1.3
17) Real Estate	1.0	0.7	1.1	0.7
18) Engineering	0.2	0.1	0.2	0.0
19) Accounting	0.3	0.0	0.5	0.1
20) Misc. business serv.	1.5	0.5	2.0	[illegible].2
21) Legal services	0.6	0.1	0.7	0.1
V. *SOCIAL SERVICES*	*26.4*	*22.4*	*32.5*	*37.[illegible]*
22) Medical services	2.7	1.6	4.1	3.7
23) Hospitals	6.0	7.6	7.1	11.4
24) Education	10.9	7.7	14.5	13.7
25) Welfare	1.4	1.1	1.6	2.0
26) Nonprofit	0.6	0.3	0.5	0.5
27) Postal services	0.3	0.4	0.4	1.3
28) Government	4.3	3.6	3.9	4.8
29) Misc. social serv.	0.2	0.0	0.3	0.1
VI. *PERSONAL SERVICES*	*15.2*	*52.4*	*13.8*	*29.1*
30) Domestic services	4.3	37.5	2.2	17.7
31) Hotels	1.4	2.8	1.3	2.4
32) Eating and drinking	5.2	5.0	5.2	4.1
33) Repair	0.3	0.2	0.4	0.2
34) Laundry	1.3	4.4	1.0	2.8
35) Barber & beauty shop	1.3	1.6	1.7	1.1
36) Entertainment	0.8	0.5	0.8	0.5
37) Misc. personal serv.	0.4	0.4	0.3	0.3
TOTAL LABOR FORCE	*99.1*	*100.0*	*99.8*	*99.9*

During the 1960's, however, the distribution of the black female labor force by industries changed drastically. As a result, the differences between white and black females became much reduced, although they still are larger than the differences between white and black males. In just ten years the share of employment of black females in domestic service decreased from 37.5 percent to 17.7 percent. While this proportion is still much higher than the respective white share, a decline of such magnitude in so short a time as one decade is quite remarkable. Moreover, if domestic service is excluded from the Personal services sector, almost equal shares of black and white females work in these industries.

Of all industry sectors, Social services experienced the largest employment expansion of black females during the 1960's. In 1970 white females still had a higher share in medical and educational services than did black females, but the difference has become almost negligible. Furthermore, although domestic services accounted for the largest individual share of the black female labor force in 1970, the shares of employment in hospitals and education have come very close to it. As was already earlier observed for males, postal services increasingly seem to attract black females. Combining the employment in hospitals, education, postal, and government services, it can be seen from Table VI-2 that the public sector accounts for 31 percent of total employment of black females in contrast to 19 percent in 1960.

By 1970 the employment in the Extractive sector had reached such a small proportion of the total labor force for both black and white females that it had lost any impact on the industry distribution of the labor force. It is noteworthy, however, that during the 1960's the shares of employment of white and black females in the Transformative sector have become much more similar, due to the fact that the proportionate employment in these industries increased for black females, while it decreased for white females. In 1970 the main differences between the two labor force groups were in construction, metal, machinery, and miscellaneous manufacturing industries, in which black females were relatively underrepresented.

In contrast to the relative convergence of the employment shares in Extractive and Transformative sectors and Social and Personal services, the difference between black and white females in Distributive and Producer services were largely maintained during the 1960's. Retail trade deserves particular attention because white females are more than twice as important as blacks in proportionate terms. Again, this small proportion of black females appears difficult to explain, and the same factors seem to be at work as was the previously discussed case for males.

Despite the fact that the share of employment of white females in Producer services was twice that of black females, there are indications to suggest that the gap is decreasing. Consider banking and financing, for example. In 1960 only 0.3 percent of all black females were employed in this industry, yet by 1970 this share increased to 1.6 percent. Thus black females made even faster gains in this industry than black males. Part of this expansion is undoubtedly due to efforts of financial institutions to gain part of the consumer market of blacks.

The discussion of the labor force trends during the 1960's for blacks and whites reveals that the differences in the employment distribution by industry has greatly diminished, i.e., the proportions of the labor force of whites and blacks in the selected industries have become more similar in 1970 than they were in 1960. This finding holds for males as well as females. The pattern is clearly demonstrated by the data in Table VII-3 which refer to the index of dissimilarity between the employment distributions by sex of blacks and whites. While in 1960 15.9 percent of either the white or black male labor force would have had to be re-distributed in order to achieve equal distributions of the two labor force groups among industries, this would have required a shift of 11.6 percent in 1970. The convergence is much more striking for females where the proportion that would have to be redistributed declined from 41.9 percent to 15.6 percent between 1960 and 1970. This drastic decrease primarily is the result of the declining share of employment of black females in domestic service, but it must be noted that Personal services in general employed lower proportions of black females in 1970 than they did in 1960. These data indeed signify a very important trend for the employment of black females. While in 1960 the majority of black females was employed in the traditional position of servant (in its various manifestations), the major part of employment of black females lost this characteristic during the 1960's. Much employment in the Social services, and particularly in hospitals where it is a similar type of work as that of a nanny, still fits the traditional employment pattern of black females, except in a more bureaucratic setting. But this is not the case for many other positions. And even where the change in employment has meant less a change in the type of work, the fact that the same work is carried on in a different organizational context is an important consideration. Being a maid in a household and a janitress in a hospital implies similar work, but in the latter case it has lost its character of being a service oriented towards individual consumption. And importantly, the latter provides opportunities for organization to press for higher wages and better working conditions that are not open to the former. In that sense, the change in the employment of black females during the 1960's is very important indeed.

Education

Educational requirements differ greatly by industry. Employment in eating and drinking places, for example, requires less education than does work in medical services. This is not to deny the fact that the task of a janitor in a clinic is less skilled than that of a manager in a restaurant, but if all positions in an industry are combined, medical services require more skills than eating and drinking places. These differences in educational requirements are likely to be reflected in the educational attainment of persons in the labor force. Thus, the educational attainment of persons employed in medical services is likely to be higher than that of persons employed in eating and drinking places.

The data in Tables VII-4 and VII-5 clearly reflect these differences. Persons in Social and Producer services have more education than those employed in the remaining industry sectors; this holds for males and females, and for blacks and whites. (Twelve years of schooling or more was chosen as a measure for educational attainment since the completion of high school is a major requirement for many

Table VII-3

INDEX OF DISSIMILARITY BETWEEN THE INDUSTRY DISTRIBUTIONS OF BLACK AND WHITE MALES AND BLACK AND WHITE FEMALES BY INDUSTRY SECTORS: UNITED STATES, 1960-1970

Industry Sectors	Males		Females	
	1960	1970	1960	1970
Extractive	2.8	0.5	1.2	0.3
Transformative	3.6	3.1	6.8	2.9
Distributive Services	2.7	3.0	7.2	5.4
Producer Services	1.9	1.7	3.7	2.7
Social Services	1.8	2.1	3.8	4.0
Personal Services	3.2	1.3	19.3	10.3
Total labor force	15.9	11.6	41.9	15.6

Table VII-4

PROPORTION OF THE MALE LABOR FORCE WITH 12 YEARS OF SCHOOLING OR MORE BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRY GROUPS, AND ETHNIC STATUS: UNITED STATES, 1960-70

Sectors and Industries	1960		1970	
	White	Black	White	Black
I. *EXTRACTIVE*	29.2	4.6	43.6	9.7
1) Agriculture	28.1	4.3	41.8	8.3
2) Mining	35.5	12.7	50.4	21.8
II. *TRANSFORMATIVE*	43.0	17.3	57.0	34.5
3) Construction	36.2	13.6	48.8	22.1
4) Food	39.4	16.2	52.4	31.2
5) Textile	29.3	24.3	40.6	30.4
6) Metal	42.0	19.2	53.4	35.0
7) Machinery	50.7	26.6	65.6	48.2
8) Chemical	58.8	19.0	72.5	48.3
9) Misc. manufacturing	40.3	13.9	55.8	33.3
10) Utilities	50.1	13.5	64.6	30.3
III. *DISTRIBUTIVE SERVICES*	48.0	23.1	60.3	36.9
11) Transportation	37.3	20.0	52.5	36.1
12) Communication	75.8	40.4	88.0	67.9
13) Wholesale	57.8	18.5	68.1	34.6
14) Retail	47.4	22.3	57.4	36.3
IV. *PRODUCER SERVICES*	74.3	32.6	86.0	51.3
15) Banking	77.4	31.8	87.2	63.6
16) Insurance	79.6	57.6	89.8	76.7
17) Real estate	53.6	25.4	68.2	32.0
18) Engineering	86.8	48.3	92.6	65.9
19) Accounting	91.9	37.5	96.3	90.0
20) Misc. business serv.	64.3	26.0	74.7	45.6
21) Legal services	95.9	64.5	98.4	81.6
V. *SOCIAL SERVICES*	69.0	48.6	80.0	60.1
22) Medical services	86.3	64.0	87.6	61.2
23) Hospitals	55.2	34.5	69.8	48.7
24) Education	78.2	56.3	85.4	63.6
25) Welfare	72.9	46.4	81.8	59.1
26) Nonprofit	55.6	30.3	67.2	52.6
27) Postal services	66.6	64.6	75.2	69.8
28) Government	61.9	43.7	76.4	58.6
29) Misc. social serv.	82.3	52.6	90.3	58.4
VI. *PERSONAL SERVICES*	37.1	22.4	48.2	29.0
30) Domestic services	22.7	14.1	23.4	11.9
31) Hotels	41.8	23.0	54.8	20.6
32) Eating and drinking	34.7	23.3	43.2	27.8
33) Repair	35.2	20.7	67.1	31.8
34) Laundry	39.7	29.2	49.0	28.9
35) Barber & beauty shop	31.9	31.7	50.5	42.0
36) Entertainment	43.6	25.1	54.0	34.2
37) Misc. personal serv.	54.4	32.0	71.1	44.8
TOTAL LABOR FORCE	47.4	27.7	61.8	38.3

Table VII-5

PROPORTION OF THE FEMALE LABOR FORCE WITH 12 YEARS OF SCHOOLING OR MORE BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRY GROUPS, AND ETHNIC STATUS.
UNITED STATES, 1960-1970

SECTORS AND INDUSTRIES	1960		1970	
	Whites	Blacks	Whites	Blacks
I. *EXTRACTIVE*	*39.5*	*6.0*	*58.7*	*16.7*
1) Agriculture	35.4	5.9	53.7	14.5
2) Mining	75.4	20.0	82.8	76.9
II. *TRANSFORMATIVE INDUSTRIES*	*44.7*	*33.2*	*55.9*	*49.5*
3) Construction	64.7	25.7	78.0	39.1
4) Food	38.5	22.1	50.6	35.9
5) Textile	75.5	34.8	35.1	45.9
6) Metal	53.5	33.4	62.9	51.2
7) Machinery	53.2	44.4	62.6	61.0
8) Chemical	67.5	38.3	72.1	66.3
9) Miscellaneous manufacturing	46.5	33.3	58.2	45.9
10) Utilities	80.0	37.3	87.4	70.0
III. *DISTRIBUTIVE SERVICES*	*55.8*	*41.9*	*66.4*	*60.4*
11) Transportation	66.7	31.2	76.3	59.5
12) Communication	71.3	64.6	84.5	81.9
13) Wholesale	66.5	30.9	75.2	54.0
14) Retail	50.8	43.0	61.4	55.1
IV. *PRODUCER SERVICES*	*77.2*	*57.6*	*85.1*	*77.1*
15) Banking	80.4	58.3	87.4	79.8
16) Insurance	78.3	72.4	86.8	82.3
17) Real Estate	64.0	41.5	75.9	44.9
18) Engineering	86.4	41.7	91.0	91.7
19) Accounting	83.8	66.7	88.1	94.6
20) Misc. business services	72.0	41.4	80.6	58.9
21) Legal services	84.8	66.7	90.6	72.6
V. *SOCIAL SERVICES*	*77.0*	*60.7*	*82.6*	*66.2*
22) Medical services	69.5	45.5	71.5	48.7
23) Hospitals	65.7	49.2	75.5	57.8
24) Education	86.8	72.8	89.2	73.3
25) Welfare	61.4	41.8	79.1	67.7
26) Nonprofit	68.6	38.5	77.8	60.0
27) Postal services	62.9	54.9	75.3	75.5
28) Government	79.5	74.1	85.3	76.3
29) Misc. social services	86.6	25.0	90.0	81.3
VI. *PERSONAL SERVICES*	*32.2*	*17.2*	*46.1*	*22.2*
30) Domestic services	19.2	14.0	29.5	16.0
31) Hotels	38.5	21.5	50.3	23.5
32) Eating and drinking	30.3	23.3	41.2	30.0
33) Repair	56.8	39.3	67.0	44.2
34) Laundry	29.2	20.6	40.6	27.3
35) Barber & beauty shop	53.8	42.9	66.3	55.2
36) Entertainment	52.9	32.1	62.1	47.5
37) Misc. personal services	46.7	39.0	65.4	42.1
TOTAL LABOR FORCE	*56.7*	*30.9*	*68.7*	*49.7*

positions in the labor market. To that extent, the difference between persons who have 12 years of education and those with only 11 years is much greater than the difference between 11 years and 10 years of education.) At the one extreme, persons employed in Personal services and agriculture have the lowest educational attainment. In 1960, however, black males in Personal services had more schooling than black males in either the Transformative, Distributive, or Extractive sectors, which suggests that ten years ago blacks in these industries were employed in different positions than in 1970. Particularly remarkable is the low educational attainment of blacks in agriculture, which even in 1970 is below that of domestic service. Although whites in agriculture, too, have low educational attainment, it nevertheless is much closer to that of other industries.

In addition to the fact that educational attainment differs by industry, the data in Table VII-6 reveal that these differences are not the same for whites and blacks. For example, taking males, it can be seen that in 1960 the share of all blacks who completed at least 12 years of schooling was 45.8 percent of the share of whites, while proportionately as many blacks as whites employed in barber and beauty shops completed 12 years of schooling (Table VII-6, Col. 1). In both 1960 and 1970 educational attainment of black males in relation to that of white males generally was higher in Social and Producer services than in other industries. Of the 19 industries in 1970, for example, in which the proportion of black males with 12 years of schooling or more was at least two-thirds that of white males, 12 were to be found in Producer and Social services.

A comparison of Tables VII-4 and VII-5 shows that in absolute terms black females have more schooling than black males. Inspecting the data in Table VII-6 it can be seen, in addition, that the amount of educational attainment of black females in relation to that of white females compares more favorably than in the case of white and black males. By 1970, only six industries (agriculture, real estate, domestic service, hotel and lodging places, repair services, and miscellaneous personal services) showed the proportion of black females with 12 years of schooling or more to be less than two-thirds the proportion of white females with the same education. Moreover, there were four industries (textiles, engineering and architectural services, accounting and bookkeeping services, and postal services) in which proportionately more black females than white females had completed at least 12 years of schooling. (It should be noted, however, that the number of black females in engineering, architectural, accounting and bookkeeping services was so small that these results could be due to sampling errors.)

Comparing the change in educational attainment from 1960 to 1970, the data in Table VII-6 clearly reveal that blacks had larger increases than whites. In 1960 proportionately less than one-half as many black as white males had 12 years of schooling or more, increasing to almost two-thirds in 1970. For black females, the proportion increased from slightly over one-half to more than two-thirds.

This relative increase in educational attainment of black males and females can be observed in the vast majority of industries. It is primarily in Personal services where whites have made more rapid educational gains than blacks. The

Table VII-6

RATIO OF PERCENT BLACKS WITH 12 YEARS OF EDUCATION OR MORE TO PERCENT WHITES WITH 12 YEARS OF EDUCATION OR MORE, BY SEX: UNITED STATES, 1960-1970

SECTORS AND INDUSTRIES	Male		Female	
	1960	1970	1960	1970
I. EXTRACTIVE	15.8	22.1	15.2	[illegible]
1) Agriculture	15.3	19.9	16.7	27.0
2) Mining	35.8	43.3	26.5	92.9
II. TRANSFORMATIVE INDUSTRIES	40.2	60.5	70.3	[illegible]
3) Construction	37.6	45.3	39.7	50.1
4) Food	41.1	59.5	57.4	70.9
5) Textile	82.9	74.9	136.5	130.8
6) Metal	45.7	65.5	62.4	81.4
7) Machinery	52.5	73.5	83.4	97.4
8) Chemical	32.3	66.6	56.7	92.0
9) Misc. manufacturing	34.5	59.7	71.6	78.9
10) Utilities	26.9	46.9	46.6	80.1
III. DISTRIBUTIVE SERVICES	44.8	61.2	75.1	90.9
11) Transportation	53.6	68.8	46.8	78.0
12) Communication	53.3	77.2	90.6	96.9
13) Wholesale	32.0	50.0	46.5	71.8
14) Retail	47.0	63.2	84.6	89.8
IV. PRODUCER SERVICES	48.9	67.1	66.8	83.5
15) Banking	41.1	72.9	72.5	91.3
16) Insurance	72.4	85.4	92.5	94.8
17) Real Estate	47.4	46.9	64.8	59.2
18) Engineering	55.6	71.2	48.3	100.8
19) Accounting	40.8	93.4	79.6	107.4
20) Misc. business services	40.4	61.0	57.5	73.1
21) Legal services	67.3	82.9	78.6	80.1
V. SOCIAL SERVICES	70.4	75.1	78.8	80.2
22) Medical services	74.2	69.5	65.5	68.1
23) Hospitals	62.5	69.8	74.9	76.6
24) Education	72.0	74.5	83.9	82.2
25) Welfare	63.6	72.2	68.1	85.6
26) Nonprofit	54.5	78.3	56.1	77.1
27) Postal services	97.0	92.8	87.3	100.3
28) Government	70.6	76.7	93.2	89.4
29) Misc. social services	63.9	64.7	28.9	90.3
VI. PERSONAL SERVICES	60.4	60.2	58.4	[illegible]
30) Domestic services	62.1	50.8	79.9	54.2
31) Hotels	55.0	54.0	55.8	46.7
32) Eating and drinking	67.1	64.4	76.9	72.8
33) Repair	58.8	67.5	69.2	66.0
34) Laundry	73.6	59.0	70.5	67.2
35) Barber & beauty shop	99.4	83.2	79.7	83.2
36) Entertainment	57.6	63.3	60.7	70.5
37) Misc. personal services	58.8	63.0	83.5	64.4
TOTAL LABOR FORCE	45.8	62.8	54.5	72.3

reasons for this are not all that clear, but it is interesting to note that in most of these industries proportionately much less blacks were employed in 1970 than in 1960. It could well be that the age structure of blacks in these industries has changed, such that in 1970 more older people were employed there. Since new labor force cohorts usually have higher educational attainment than the previous cohorts, the absence of new black labor force entries into the Personal services sector might have reduced the amount of schooling in these industries in relation to that of whites.

In the same vein, many of the gains in educational attainment of blacks in the other industries are most likely to be due to the better schooling of the younger labor force cohorts. As was pointed out earlier in this chapter, the majority of the consequences of the various civil rights legislation passed during the 1960's will benefit the younger members of minorities the most, as they can benefit from increasing educational opportunities. While the amount of these opportunities should not be overestimated--there still exists too much inequality in the school system primarily based on racial differences--it nevertheless can be expected that new labor force entries have higher educational attainment than their predecessors.

The preceding discussion of education may leave the reader with an incomplete impression of the relationship between education and the allocation of employment to jobs. To repeat, industries certainly differ in their educational requirements. Relatively less education, for example, is needed to perform domestic work than is the case with legal services. Relating these requirements to the fact that the median educational attainment of blacks is lower than that of whites, one might wish to conclude that it is largely education that determines the allocation of blacks to industries. As the comparison between males and females in the previous chapter demonstrates, however, education plays only a minor part in the allocation of females to positions. To be sure, it can be expected that those members of the labor force whose educational attainment is low are more likely to be employed in industries with few skill requirements. The point to be made here, however, is that for the majority of positions in the labor force blacks do have the "necessary" education. As was pointed out by Fogel (1967), education often is used rather as a selection criterion in the hiring process and it bears scant relationship to the skill needs of a particular work position. Furthermore, as on-the-job training becomes more and more important for productivity, the argument that it is because of lack of educational attainment that blacks are in different industries increasingly has lost its plausibility (if it ever had any). Thus, even a narrowing of the gap between black and white educational attainment will not necessarily reduce the differences in the allocation of these labor force groups to certain positions.

Bergmann and Lyle (1971) in their analysis of occupational status differentials between blacks and whites provide further evidence for this line of reasoning. As they put it (1971:433):

> "Explanations of the differences in Negro occupational standing among metropolitan areas or among industries which run in terms of differences

in circumstances having little or nothing to do with employment discrimination are not supported by our results. Variables bearing on the quantity and quality of education do not help in predicting Negro occupational standing by area."

Instead, Bergmann and Lyle found the sentiment towards blacks in communities to be one of the most powerful variables to explain black-white differences in occupational status. This finding does not imply that educational attainment should not improve the position of blacks, but it "may change the pecking order among the Negro community more than it changes the overall status of the Negro community relative to the white community" (Bergmann and Lyle, 1971:433). One of the most distressing findings in their study was the fact that industries with a high involvement in Federal government contracts are characterized by large occupational status differentials between blacks and whites (1971:431). If this pattern prevails, it will further curb the chances of minority members to achieve equal participation in the labor market.

Given the existence of many other factors that make for an unequal competition in the labor force between blacks and whites, the fact that educational attainment of the two population groups still differs significantly should lead us to the expectation that these differences will be strongly reflected in the occupational distribution of whites and blacks. The following section addresses this aspect of the differences in white and black employment.

Occupational Status

Males. The data in Table VII-7 show that the occupational differences between black and white males was largely maintained during the last decade. The proportions of employment of black males were smaller than the corresponding white proportions in all major occupational groups, from craftsmen to professionals (the only exception occurred in 1970 when proportionately slightly more blacks than whites were clerical workers). Blacks quite clearly are concentrated in the low-status occupations: operatives, service workers, laborers, and farm workers. In 1970 these occupational groups accounted for 64.5 percent of all black males in the labor force, as compared with 32.1 percent of all white males (the respective figures for 1960 are 72.8 and 33.6 percent).

These data indicate that the proportion of blacks in low-status occupations decreased faster than did that of whites and, as a result, occupational differentiation by race also decreased slightly from 1960 to 1970 (the index of dissimilarity in 1970 was 33.5 compared with 39.1 in 1960). But it must also be noted that white males continue to hold better occupations than do blacks. In 1970, for example, proportionately three times as many blacks as whites were in low-status occupations. Whatever progress black males have made in occupational terms, the discrepancies between white and black males are still very pronounced.

It repeatedly has been noted in this study that the industry structure and the occupational structure are by no means independent of each other. Since it was pointed out earlier that blacks are in different industries than whites, some occupational differences could have been expected. While it is instructive to point out

Table VII-7

PERCENTAGE DISTRIBUTION OF THE MALE LABOR FORCE BY MAJOR OCCUPATIONAL GROUPS AND ETHNIC STATUS: UNITED STATES, 1960-1970

Occupation	1960			1970		
	White (1)	Black (2)	Difference (3)=(2)-(1)	White (4)	Black (5)	Difference (6)=(5)-(4)
Professionals	7.4	1.8	-5.6	9.9	3.1	-6.8
Sub-Professionals	4.2	1.6	-2.6	5.4	3.1	-2.3
Farmers	5.9	4.6	-1.3	3.1	0.8	-2.3
Managers	12.1	1.8	-10.3	12.4	3.1	-9.3
Clerical	7.5	5.5	-2.0	7.6	8.3	0.7
Sales	7.8	1.5	-6.3	7.9	2.2	-5.7
Craftsmen	21.5	10.6	-10.9	21.6	15.1	-6.5
Operatives	20.3	26.5	6.2	18.1	29.4	11.3
Service Workers	5.5	16.4	10.9	7.2	16.1	8.9
Laborers	5.7	22.1	16.4	5.5	15.4	9.9
Farm Workers	2.1	7.8	5.7	1.3	3.6	2.3
TOTALS	100.0	100.2		100.0	100.2	

the occupational consequences of the different industry distributions of whites and blacks in the labor force (as seen in Table VII-7), it is equally important to examine the extent to which blacks and whites maintain different occupations in the same industry.

The low-status occupations (operatives, service workers, laborers, and farm workers) account for the smallest proportions of both white and black employment in Social and Producer services, while their shares of employment in Personal services and agriculture is much higher (see Table VII-8). Thus it can be observed that the proportion of blacks and whites in low-status occupations in general depends upon the occupational requirements of the various industries. But besides these "functional" differences among industries, additional differences exist in terms of ethnic status, i.e., some industries are characterized by a large concentration of blacks in low-status occupations in relation to the percentage of whites. Thus, although for the total labor force the proportion of blacks in low-status occupations is about twice as high as that of whites, it is at least three times as high in construction, utilities, communication, banking, real estate, engineering, and medical services. These industries must therefore be considered as particularly unfavorable for the employment of blacks in higher-status occupations.

As far as the 1960-70 changes are concerned, it can be noted that the overall decline of blacks in low-status occupations was due more to their changing employment distribution among industries than to occupational improvements within industries. That is, the proportion of white and black males in low-status occupations changed quite similarly during the 1960's. For example, consider the textile industry: its total employment--whites as well as blacks--is increasingly concentrated in the lower-status occupations, primarily as operatives. Both whites and blacks thus are subject to the different employment needs arising from technological and organizational changes.

Females. The finding that blacks staff the low-status positions in the labor force is as valid for females as for males (see Table VII-9). But whereas black males are primarily operatives, black females are mostly service workers. This was very pronounced as recently as 1960 when 62.4 percent of all black females in the labor force were service workers. In contrast, only 17.4 percent of all employed white females were in service occupations at that time. On the other hand, while most white females are clerical workers, this occupation accounted for only 8.1 percent of black females in 1960. As black females strongly left Personal services during the 1960's, proportionately fewer black females were service workers (Table VII-9). But even in 1970 the most important differences in the occupational distribution between whites and blacks still involved service occupations in which blacks predominate, and clerical occupations where Anglos are concentrated. The employment proportions of blacks and whites in the other occupational groups remained fairly stable in relation to each other. In 1960, for example, the share of white females that were professional was 4.7 percentage points higher than that of blacks, while this difference was 4.1 percentage points in 1970. Besides service and clerical occupations, only the proportions in operatives showed more changes during the last decade. Apparently as a consequence of the growing share of black females in Transformative industries, proportionately more females were operatives in 1970 than in

Table VII-8

PROPORTION OF MALES THAT ARE OPERATIVES, SERVICE WORKERS, LABORERS, AND FARM WORKERS BY ETHNIC STATUS: UNITED STATES: 1960-1970

Sectors and Industries	1960		1970	
	White	Black	White	Black
I. *EXTRACTIVE*	*33.4*	*66.9*	*36.2*	*81.7*
1) Agriculture	29.2	64.7	50.3	87.5
2) Mining	37.5	86.2	10.6	23.1
II. *TRANSFORMATIVE*	*39.4*	*77.5*	*35.9*	*69.0*
3) Construction	23.3	63.2	6.4	38.5
4) Food	55.1	87.9	58.6	86.7
5) Textile	58.3	79.0	84.5	94.1
6) Metal	44.2	78.1	44.4	76.2
7) Machinery	38.6	75.6	52.7	78.6
8) Chemical	37.4	85.3	33.4	83.2
9) Misc. manufacturing	45.6	85.3	39.7	75.9
10) Utilities	30.2	86.3	22.7	71.4
III. *DISTRIBUTIVE SERVICES*	*30.1*	*76.9*	*31.2*	*64.7*
11) Transportation	53.0	88.9	52.9	82.0
12) Communication	3.9	41.4	2.9	20.7
13) Wholesale	23.6	80.9	24.9	68.9
14) Retail	23.3	67.7	27.6	53.8
IV. *PRODUCER SERVICES*	*9.6*	*58.9*	*10.2*	*49.0*
15) Banking	5.3	66.4	4.8	30.9
16) Insurance	1.5	21.2	1.1	1.6
17) Real Estate	21.6	64.8	19.4	62.8
18) Engineering	4.2	50.0	3.3	22.0
19) Accounting	.4	33.3	.6	3.3
20) Misc. business serv.	22.6	69.5	25.8	69.3
21) Legal services	1.3	29.6	1.0	7.9
V. *SOCIAL SERVICES*	*15.1*	*38.1*	*15.2*	*46.2*
22) Medical services	6.0	7.2	12.3	49.8
23) Hospitals	40.8	83.0	38.4	71.7
24) Education	19.5	44.9	18.6	43.1
25) Welfare	17.9	35.3	15.9	34.4
26) Nonprofit	25.9	75.3	23.4	48.7
27) Postal services	6.3	20.2	6.8	20.0
28) Government	36.7	59.6	39.0	52.0
29) Misc. social serv.	4.2	41.2	7.2	29.2
VI. *PERSONAL SERVICES*	*46.5*	*85.3*	*49.1*	*74.8*
30) Domestic services	89.0	99.9	86.6	96.7
31) Hotels	62.9	96.3	47.9	86.6
32) Eating & drinking	84.3	92.2	60.4	85.1
33) Repair	12.1	54.8	18.1	36.8
34) Laundry	61.9	92.3	53.7	84.7
35) Barber & beauty shop	95.8	97.5	98.6	99.5
36) Entertainment	31.8	71.4	40.6	63.2
37) Misc. personal serv.	58.3	75.6	13.8	43.3
TOTAL LABOR FORCE	*34.6*	*72.8*	*32.1*	*64.5*

Table VII-9

PERCENTAGE DISTRIBUTION OF THE FEMALE LABOR FORCE BY MAJOR OCCUPATIONAL GROUPS AND AND ETHNIC STATUS: UNITED STATES, 1960-70

OCCUPATION	1960			1970		
	White (1)	Black (2)	Difference (3)=(2)-(1)	White (4)	Black (5)	Difference (6)=(5)-(4)
Professionals	11.0	6.3	-4.7	12.4	8.3	-4.1
Sub-professionals	3.7	1.5	-2.2	4.3	3.3	-1.0
Farmers	0.6	0.7	0.1	0.2	0.1	-0.1
Managers	4.3	1.1	-3.2	4.1	1.5	-2.6
Clerical	34.7	8.1	-26.6	37.2	21.1	-16.1
Sales	9.2	1.5	-7.7	8.0	2.5	-5.5
Craftsmen	1.3	0.7	-0.6	1.8	1.4	-0.4
Operatives	16.4	13.6	-2.8	13.5	16.3	2.8
Service Workers	17.4	62.4	45.0	17.3	43.0	25.7
Laborers	0.5	1.1	0.6	0.9	1.6	0.7
Farm Workers	1.0	3.1	2.1	0.4	1.0	0.6
	100.1	100.1	0.0	100.1	100.1	0.0

1960. Correspondingly, the employment share of white females in operative occupations declined as whites moved out of the Transformative sector.

While the decline of the employment share of black females in low-status occupations from 80.2 to 61.9 percent suggests improved conditions for the employment of blacks, it must again be examined--as in the case of males--to what extent this improvement resulted from the sectoral transformation of black females, and to what extent it reflects better positions within the industries themselves.

The data in Table VII-10 reveal that the vast majority of employment in Personal services involves low-status occupations. In 1970, for example, over 90 percent of all black females employed in domestic service, hotels, and barber and beauty shops were in low-status occupations, and in two other industries--eating and drinking places and laundry and dyeing services--this proportion was over 85 percent. Thus, a good case can be made for the assertion that most of the occupational improvements of black females resulted from their shift from Personal services to other sectors where black females are less concentrated in low-status occupations. In comparison to the dramatic decrease of the proportion of black females in Personal services, the occupational improvements within the various industries were much less apparent.

It must be noted, on the other hand, that although Producer services, of all sectors, shows the smallest share of black females in low-status occupations, comparison with whites reveals that this results only from the fact that these industries in general do not make much use of low-status occupations. Indeed, black females in relation to white females show the highest concentration in low-status occupations in Producer services. All these industries have in common proportionately at least three times as many black as white females employed as operatives, service workers, or laborers, although this ratio is only two to one for the total labor force. Other industries with similarly high relative concentrations of black females in low-status occupations include utilities, miscellaneous social and professional services, and repair services.

This analysis of the occupational status of black males and females suggests that blacks in general are employed in better occupations in 1970 than they were in 1960. This improvement, however, is due more to the fact that they work in different industries than to occupational improvements within industries. Even within the rapidly growing Social services blacks are frequently employed in the traditionally black occupations of orderlies, porters, nurses' aides, and janitors. It thus appears that the occupational distribution can be considered as a zero-sum game, in which each industry is characterized by a certain functional occupational distribution which is dependent on technological improvements and organizational changes. Given this assumption, any significant occupational improvements of blacks (in relation to whites) must mean a worsening of the occupational positions of whites, given the same technology and organization. If this assumption is true, most improvements for blacks then will rest upon technological changes, unless blacks gain additional power that would enable them to make improvements at the expense of whites.

Table VII-10

PROPORTION OF FEMALES THAT ARE OPERATIVES, SERVICE WORKERS, LABORERS AND FARM WORKERS BY ETHNIC STATUS: UNITED STATES 1960-1970

Sectors and Industries	1960 White	1960 Black	1970 White	1970 Black
I. *EXTRACTIVE*	*54.3*	*88.9*	*43.4*	*85.2*
1) Agriculture	59.3	82.9	33.0	82.2
2) Mining	5.4	83.3	49.3	76.8
II. *TRANSFORMATIVE*	*57.7*	*87.1*	*54.6*	*80.0*
3) Construction	5.4	53.1	20.8	50.5
4) Food	57.5	92.0	54.6	80.1
5) Textile	87.6	94.4	49.1	80.3
6) Metal	43.2	79.6	45.4	72.4
7) Machinery	51.7	88.1	37.6	69.5
8) Chemical	24.5	76.8	31.3	63.4
9) Misc. manufacturing	52.5	80.9	55.4	72.7
10) Utilities	4.4	61.6	4.1	21.6
III. *DISTRIBUTIVE SERVICES*	*9.1*	*44.8*	*11.3*	*26.0*
11) Transportation	19.8	74.8	33.1	46.8
12) Communication	1.7	20.9	3.6	4.0
13) Wholesale	11.8	72.8	14.4	50.8
14) Retail	8.8	40.5	9.8	25.3
IV. *PRODUCER SERVICES*	*4.4*	*46.3*	*4.1*	*21.6*
15) Banking	2.7	51.3	1.8	8.4
16) Insurance	1.6	12.0	1.0	4.5
17) Real Estate	12.2	63.9	9.0	57.8
18) Engineering	2.8	25.0	2.0	25.0
19) Accounting	.9	.0	.3	8.1
20) Misc. business serv.	10.5	53.6	11.4	40.4
21) Legal services	.7	21.4	.8	12.2
V. *SOCIAL SERVICES*	*18.8*	*47.3*	*27.7*	*43.5*
22) Medical services	22.4	25.2	43.8	72.9
23) Hospitals	35.4	73.2	36.8	70.5
24) Education	12.9	29.7	13.6	27.7
25) Welfare	32.1	57.4	18.6	31.1
26) Nonprofit	13.3	74.0	15.7	44.4
27) Postal services	1.9	16.0	2.9	8.3
28) Government	5.7	21.2	7.5	18.3
29) Misc. social serv.	3.9	42.9	5.6	23.3
VI. *PERSONAL SERVICES*	*80.7*	*97.7*	*76.6*	*94.7*
30) Domestic services	98.9	96.7	96.2	99.5
31) Hotels	44.6	90.3	64.3	95.1
32) Eating & drinking	64.0	89.7	83.5	87.4
33) Repair	18.4	55.6	13.4	55.1
34) Laundry	56.5	88.2	51.1	85.2
35) Barber & beauty shop	97.4	97.1	96.0	98.5
36) Entertainment	37.3	79.0	31.9	58.7
37) Misc. personal serv.	15.2	46.9	48.3	58.7
TOTAL LABOR FORCE	*35.3*	*80.2*	*32.1*	*61.9*

Income

On the basis of the previous findings about the educational attainment and occupational status of blacks, it comes as no surprise that their median income is lower than that of whites. In 1969, the median income of black males was about two-thirds that of white males (see Table VII-11). Although this is an increase over the 1960 proportion, it is relatively small given the fact that during the 1960's the low-wage industries of the Extractive and Personal services sectors accounted for decreasing shares of employed black males. Moreover, in a substantial number of industries (17 out of 37), black males in 1969 earned less in relation to whites than they did ten years earlier. This situation is particularly noticeable in the Transformative sector. Despite the increased share of black males in this sector during the 1960's, their median income in relation to that of whites declined in five of the eight Transformative industries. Of all industry sectors, black males in 1970 compared most favorably with whites in the Social and Personal services sectors.

The data for income demonstrate again that in comparison with whites, black females do much better than black males. Noteworthy is the large increase in relative median income of black females during the 1960's; in 1969, their median income was 92 percent of that of white females.

This high proportion is mostly due to the fact that in an increasing number of industries, particularly in the Social and Personal services sectors, black females have a higher median income than white females. The previous discussion showed that this cannot be the result of occupational status, for blacks in general are in lower status occupations than are whites. The high ratios for black females in the Social and Personal services sectors are, in contrast, largely due to the fact that they work more hours. This is demonstrated in Table VII-12 in which the mean number of yearly hours per black worker is given as proportion of the mean number of yearly hours for white workers. As the data in Table VII-12 show, black females work more hours in 1969 than white females in all Social and Personal services except in repair services and barber and beauty shops. (It must be pointed out, however, that in the case of income we are dealing with medians, whereas the data for hours refer to means. Since in the case of hours, we cannot assume a normal distribution, there should be a substantial difference between the mean and median of hours worked per year. For that reason, the data here are suggestive and do not permit a conclusive interpretation.)

Throughout this section, it has been noted that in relation to whites, black females compared more favorably than black males. What are the reasons for this situation? Two explanations are offered here. For one thing, the previous chapter showed that females in general are in less favorable positions than males. Thus, once the sex differential, in terms of the labor force situation, is controlled for not much additional discrimination occurs. Second, black females have a much higher labor force participation rate than white females. In general, there is a positive association between female labor force participation and socioeconomic status. Moreover, black females are more likely than white females to be head of household. In 1970, 9.0 percent of all white households and 27.4 percent of all black households were headed by women. (At the same time, however, these data dispel the notion that the "typical" black family has a female household head.) In sum,

Table VII-11

MEDIAN INCOME OF BLACKS AS PROPORTION OF MEDIAN INCOME OF WHITES, BY SEX: UNITED STATES, 1960-1970

	Males		**Females**	
Sectors and Industries	1960	1970	1960	1970
I. *EXTRACTIVE*	*.46*	*.48*	*1.00*	*.94**
1) Agriculture	.42	.62	.86	.59*
2) Mining	.66	.64*	.48	.75
II. *TRANSFORMATIVE*	*.61*	*.63*	*.90*	*.94*
3) Construction	.68	.60*	.45	.92
4) Food	.52	.64*	.84	.80*
5) Textile	.78	.70*	1.06	.84*
6) Metal	.80	.74*	.72	.78
7) Machinery	.88	.79*	1.12	.79*
8) Chemical	.65	.71	.66	.83
9) Misc. manufacturing	.44	.60	.87	.90
10) Utilities	.71	.71	.36	1.07
III. *DISTRIBUTIVE SERVICES*	*.55*	*.81*	*.81*	*.94*
11) Transportation	.78	.81	.58	1.06
12) Communication	.54	.35*	1.11	.80*
13) Wholesale	.59	.70	.78	.81
14) Retail	.56	.73	1.00	1.22
IV. *PRODUCER SERVICES*	*.58*	*.58*	*.71*	*.88*
15) Banking	.44	.36*	.70	1.04
16) Insurance	.55	.42*	.89	.90
17) Real Estate	.52	.63	.95	.76*
18) Engineering	.41	.49	.44	.84
19) Accounting	No data	.57	1.22	1.01*
20) Misc. business serv.	.72	.74	.44	.88
21) Legal services	.29	.26*	.60	.77
V. *SOCIAL SERVICES*	*.75*	*.80*	*.83*	*1.04*
22) Medical services	.25	.31	.93	1.12
23) Hospitals	.74	.83	1.10	1.03*
24) Education	.64	.60*	.88	1.07
25) Welfare	.61	.77	1.07	1.08
26) Nonprofit	.57	.70	.67	.75
27) Postal services	1.08	.84*	1.19	1.16*
28) Government	.89	.82*	.79	1.04
29) Misc. social serv.	.65	.37*	.90	.92
VI. *PERSONAL SERVICES*	*.67*	*.81*	*.62*	*1.16*
30) Domestic services	1.07	1.38	.96	1.66
31) Hotels	.75	.51*	1.13	.95*
32) Eating & drinking	.79	.84	1.04	1.26
33) Repair	.70	.84	1.60	.74*
34) Laundry	.68	.88	.63	.90
35) Barber & beauty shop	.69	.59*	.48	.66
36) Entertainment	.67	.93	1.03	1.26
37) Misc. personal serv.	.59	.46*	.61	.76
TOTAL LABOR FORCE	*.56*	*.65*	*.70*	*.91*

* 1970 values lower than 1960 values.

Table VII -12

MEAN NUMBER OF YEARLY HOURS PER EMPLOYED BLACK AS PROPORTION OF MEAN NUMBER OF YEARLY HOURS PER EMPLOYED WHITE BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRY, AND SEX: 1969

Sectors and Industries	Males	Females
I. *EXTRACTIVE*	.77	.63
1) Agriculture	.75	.64
2) Mining	.92	.83
II. *TRANSFORMATIVE*	.94	.98
3) Construction	.90	1.04
4) Food	.92	.98
5) Textile	.95	1.00
6) Metal	.94	.96
7) Machinery	.94	.97
8) Chemical	.96	.94
9) Misc. manufacturing	.95	1.00
10) Utilities	.94	.97
III. *DISTRIBUTIVE SERVICES*	.92	1.05
11) Transportation	.92	1.03
12) Communication	.89	.96
13) Wholesale	.91	.99
14) Retail	.92	1.06
IV. *PRODUCER SERVICES*	.92	.99
15) Banking	.93	.95
16) Insurance	.91	.99
17) Real Estate	.97	1.05
18) Engineering	1.00	1.08
19) Accounting	.92	.96
20) Misc. business serv.	.93	1.04
21) Legal services	.84	.92
V. *SOCIAL SERVICES*	.94	1.10
22) Medical services	.88	1.07
23) Hospitals	.96	1.11
24) Education	.96	1.07
25) Welfare	.89	1.11
26) Nonprofit	.92	1.01
27) Postal services	.97	1.17
28) Government	.94	1.00
29) Misc. social serv.	.79	1.10
VI. *PERSONAL SERVICES*	.94	1.04
30) Domestic services	1.30	1.25
31) Hotels	.96	1.04
32) Eating & drinking	1.00	1.20
33) Repair	.94	.93
34) Laundry	.93	1.10
35) Barber & beauty shop	.91	.95
36) Entertainment	1.02	1.22
37) Misc. personal serv.	.82	1.02

these differences between black and white females indicate that blacks depend more on employment than whites. As an indication of this situation, the data in Table VII-12 show that black females worked more hours in 1969 than white females. Given this relatively stronger commitment to employment, black females should be expected to do as well, if not better, than white females.

ANGLOS, BLACKS, AND MEXICAN AMERICANS IN THE SOUTHWEST

Up to this point, this chapter has been confined to the analysis of the differences in the labor force situation between whites and blacks. As we pointed out earlier, concentration on the black-white differentials was necessitated by the fact that on the national level blacks are the only large minority for which census data are available. This is an important consideration, since the scope of this investigation is the national situation. On the other hand, however, much can be gained from a comparative analysis of different minorities. Since Mexican Americans are the second largest minority in the United States, the last section of this chapter examines the differences between Anglos, Mexican Americans, and Blacks.

The situation of Mexican Americans differs from that of the other two population groups in several ways. For example, the native language of most Mexican Americans is Spanish which brings with it a whole set of considerations that are special to this minority group. Since a substantial proportion of Mexican Americans--particularly the older generations--only has a partial knowledge of the English language, it can be expected to have many difficulties in the labor market. As a result, many of them are likely to hold relatively low-status positions.

Since much discrimination against specific population groups occurs on the basis of visible characteristics such as sex or skin color, many yet by no means all Mexican Americans, on the other hand, could be expected to fare relatively better than Blacks.

So far, little information exists about Mexican Americans and there are even fewer studies comparing the three population groups (notable exceptions include Shannon and McKim, 1974; Poston and Alvirez, 1973; Grebler et al., 1970; Fogel, 1967; Browning and McLemore, 1964). Much of this probably has to do with the inadequacy of the data that are available. Until 1960, the Census Bureau collected information about Mexican Americans only in the five Southwestern states (Arizona, California, Colorado, New Mexico, and Texas). Although the 1970 census permits a study of "Mexican Americans" on the national level, there are still many problems with the enumeration (see e.g. Hernandez, et al., 1973). As Poston and Alvirez (1973:699) note: "Mexican Americans per se were not enumerated in the 1960 census; instead they were identified on an ex post facto basis by the Bureau of the Census as white persons of Spanish surname." This approach is unsatisfying for obvious reasons; not all Mexican Americans have Spanish surnames nor is everyone with a Spanish surname Mexican American. By and large, as a consequence, this procedure has tended to underestimate the number of Mexican Americans in the United States. In this section, then, we shall refer to whites without a Spanish surname as "Anglos" and whites with a Spanish surname will be called "Mexican Americans." No change is made for the identification of Blacks, except to use upper rather than lower case in this context.

For reasons of comparability with the 1960 census, we will restrict the analysis of the three ethnic groups to the Southwestern states. This geographical restriction unfortunately limits the investigation to the level of industry sectors, since the reduced data base does not permit an examination of more detailed industries. As was done throughout this chapter, the following discussion again differentiates between males and females.

The Industry Structure of Male Employment. The most striking difference in the industry allocation between the three ethnic groups is the large concentration of Mexican American males in the Extractive sector. Although the proportion of Mexican American males in these industries decreased substantially during the 1960's from 22.9 to 11.8 percent, thus reflecting the increasing urbanization of Mexican Americans (Grebler, et al., 1970), it still remained the highest among the three ethnic groups in 1970 (Table VII-13).

An interesting trend appears in the Transformative sector. In contrast to the declining proportion of employment for Anglo males during the last decade, Blacks and Mexican Americans have extended their shares of employment in this sector. Since the wages in this sector in general compare quite favorably with other industries, this trend might result in a relative improvement of the labor force positions of these two minorities.

We noted earlier for the national labor force that Blacks were strongly underrepresented in Producer services. The same situation prevails in the Southwest, and Mexican Americans are even less represented in this sector than Black males. On the basis of these findings, it can now be stated that Producer services in general tend to exclude minorities from employment, and this exclusion has not lessened much during the 1960's.

The overriding finding of the analysis of the industry structure of the three ethnic groups in the labor force is, apart from the relatively high share of Mexican American males in the Extractive sector, the great similarity in the way in which they are allocated to the various industry sectors.

The Industry Structure of Female Employment. In contrast to the similarity in the industry structure of employment for males, pronounced differences exist among the three ethnic groups for females. Clearly, the most outstanding feature of Table VII-13 is the high proportion of Black females in Personal services in 1960 and their subsequent move into Social services during the 1960's. This remarkable concentration of employment in Personal services is unique to Black females and it is not a general feature of minorities. The share of employment for Mexican American females in this sector never came close to that of Blacks. Black females, however, are not concentrated throughout the Personal services sector. The employment differential between Black females and the other two ethnic groups is due to one industry, domestic service. In 1960, 39.9 percent of all employed Black females worked in domestic service, compared with only 11.0 percent for Mexican American

Table VII-13

PERCENTAGE DISTRIBUTION OF THE LABOR FORCE BY INDUSTRY SECTOR, SEX, AND ETHNIC STATUS: SOUTHWEST, 1960-1970

INDUSTRY SECTOR	1960			1970			1960-1970 CHANGE		
	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American
Males									
I. EXTRACTIVE	10.2	9.3	22.9	6.5	4.4	11.8	-3.7	-4.9	-10.1
II. TRANSFORMATIVE	38.6	33.9	34.3	34.0	36.7	37.4	-4.6	2.8	3.1
III. DISTRIBUTIVE SERVICES	23.5	22.4	20.6	25.5	22.3	22.7	2.0	-0.1	2.1
IV. PRODUCER SERVICES	7.1	3.3	2.6	9.1	5.6	4.6	2.0	2.3	2.0
V. SOCIAL SERVICES	13.0	15.9	9.9	16.8	20.5	14.0	3.8	4.6	4.1
VI. PERSONAL SERVICES	7.6	15.2	9.7	8.0	10.4	9.4	0.4	-4.8	-0.3
TOTAL	100.0	100.0	100.0	99.9	99.9	99.9			
Females									
I. EXTRACTIVE	2.7	1.7	5.4	1.4	0.6	3.0	-1.3	-1.9	-2.4
II. TRANSFORMATIVE	18.1	8.5	22.3	14.1	12.3	22.3	-4.0	3.8	0.0
III. DISTRIBUTIVE SERVICES	22.5	7.2	20.7	22.7	11.2	18.5	0.2	4.0	-2.2
IV. PRODUCER SERVICES	11.0	2.5	6.3	12.8	6.0	8.9	1.8	3.5	2.6
V. SOCIAL SERVICES	28.0	22.4	16.3	34.6	38.1	27.1	6.6	15.7	10.8
VI. PERSONAL SERVICES	17.6	57.6	28.9	14.4	31.8	20.1	-3.2	-25.8	-8.8
TOTAL	99.9	99.9	99.9	100.0	100.0	99.9			

females and 4.7 percent for Anglo females. If domestic service is excluded from the Personal services sector, no significant differences exist in the shares of employment in that sector between the three ethnic groups.

The large concentration of Black females in domestic service is difficult to explain in view of the fact that the other minority group, Mexican American females, is much less likely to be employed as maids. Given the fact that Blacks and Mexican Americans share a rather similar socioeconomic situation, a similar employment pattern could have been expected. On the other hand, Mexican American females have a much lower labor force participation rate than Black females (lower even than that of Anglo females). Once again, the fact that the socioeconomic status of the two groups is similar could have led to the anticipation that they would participate in the labor force at a higher rate. This situation demonstrates that the labor force status of Blacks cannot be generalized for other minority groups as well. Although socioeconomic status have been used in explaining differences between Blacks and Anglos in the labor force, it does not explain all the differences between Blacks and Mexican Americans. As more data on Mexican Americans become available, a detailed study comparing Mexican Americans with Blacks should give us a much better understanding of the process by which minorities are employed than we have at present.

Again, it must be noted that for females as much as for males, Producer services exclude Blacks and Mexican Americans from employment. Although the gap has slightly decreased during the 1960's, particularly concerning Mexican American females, in 1970 Anglo females still are relatively twice as numerous in this sector than are Black females. One might want to examine this situation in conjunction with the trend in the Transformative sector where Anglos experience a proportionate employment decline. In contrast, minorities either expand their share of employment or maintain it at a constant level. This trend raises the possibility that one of the future employment differences between Anglo females and minority females could show an increasing absorption of minorities in the lower status occupations of operatives within the Transformative sector with Anglos holding the more prestigious clerical positions in Producer services.

One additional observation is warranted. One of the main findings in regard to the different industry allocation of Blacks and Whites was the underrepresentation of Blacks, and particularly of Black females, in retail trade. A similar situation exists in the Southwest, although in 1960 the share of employment in retail trade was quite similar for Black and Anglo males (11.2 and 12.3 percent, respectively). It is only during the 1960's that the employment gap in retailing emerged between Anglo and Black males. For females, however, the situation in the Southwest is very similar to that for the total labor force. But in contrast to Producer services, the exclusion of Blacks from retail employment does not extend to Mexican Americans as well. This is particularly true for Mexican American females whose shares of employment in retailing are much closer to those of Anglo females than to Black females. Again, the reasons for this remain unclear at this point. But it seems to have nothing to do with differential rates of self-employment or unpaid family work in this industry among the three ethnic groups. In other words, Mexican American females do not have larger shares of employment in retailing because they are more likely to own their stores or work as unpaid family members. The proportion of self-employment in this industry is higher for Black females than for Mexican American females.

Educational Attainment

Since reference has been made to the assertion that Blacks and Mexican Americans as groups, have a similar socioeconomic status, it is useful here to examine one aspect of this, educational attainment. It must be expected that educational attainment of Blacks and Mexican Americans in the labor force is substantially below that of Anglos. But it is less clear to what extent this difference might vary among industry sectors. Similarly, although both Blacks and Mexican Americans have lower educational attainment than Anglos, it might differ between minority groups themselves. These possibilities will be examined in the following section. For the same reasons that were explained in the earlier part of this chapter which dealt with educational attainment on the national level, the proportion of the labor force which completed at least twelve years of schooling is chosen here as the indicator for educational attainment of the labor force.

Males. The data in Table VII-14 clearly show that Black as well as Mexican American males are less likely to have 12 years of schooling completed than is Anglo employment. We can compute the relative proportion for minorities having completed this level of education by dividing their proportions by the corresponding ones for Anglos. Following this procedure, for every 100 Anglos in the labor force with 12 years of schooling or more in 1970, there are 69 Blacks with the same educational attainment. The corresponding relative proportion for Mexican Americans is 60. Although these figures are substantially below the Anglo values, the gap in educational attainment between Anglos and the two minorities nevertheless has become narrower during the 1960-70 decade (the 1960 figures for Blacks and Mexican Americans were 55 and 40, respectively).

The data show in addition that the relative educational attainment of the two minorities varies substantially by industry sectors. Black males do relatively best in Social services, and in two other sectors, their relative educational attainment is higher than that of the total Black male labor force. The relatively low educational attainment of the Mexican American male labor force is largely the result of their extremely low educational attainment in the Extractive sector, which, because of its size for Mexican Americans, influences the total values more than for the case of the other two ethnic groups. In the remaining sectors, their educational attainment comes much closer to that of Anglos.

Turning our attention now to the Black-Mexican American differentials in educational attainment, the data in Table VII-14 demonstrate that by and large, Black males have higher educational attainment than Mexican American males. In 1970, for example, 47.6 percent of all Black males in the labor force had at least 12 years of schooling completed compared to 41.1 percent of all employed Mexican American males. This finding holds for all industry sectors except Extractive industries and Producer services, in which Mexican Americans have a higher proportion of employment with 12 years of schooling completed. Noteworthy is the large educational differential between Blacks and Mexican Americans in the Producer services sector. Although proportionately even fewer Mexican American males are employed in these services, the ones that do work there are highly educated.

Table VII-14

PERCENT OF THE LABOR FORCE WITH 12 YEARS OF SCHOOLING OR MORE, BY INDUSTRY SECTOR, SEX, AND ETHNIC STATUS: SOUTHWEST, 1960-1970

INDUSTRY SECTOR	1960			1970			1960-1970 CHANGE		
	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American
Males									
I. EXTRACTIVE	34.5	9.0	5.9	52.1	15.4	17.6	17.6	6.4	11.7
II. TRANSFORMATIVE	50.6	25.8	22.0	62.2	43.9	38.1	11.6	18.1	16.1
III. DISTRIBUTIVE SERVICES	53.8	25.8	23.7	66.1	46.1	43.9	12.3	20.3	20.2
IV. PRODUCER SERVICES	77.9	39.3	54.6	86.5	57.3	73.1	8.6	18.0	18.5
V. SOCIAL SERVICES	72.4	53.4	45.5	84.0	67.0	62.4	11.6	13.6	16.9
VI. PERSONAL SERVICES	41.6	27.8	16.7	54.4	34.4	32.7	12.8	6.6	16.0
TOTAL	53.8	29.4	21.3	69.1	47.6	41.1	15.3	18.2	19.8
Females									
I. EXTRACTIVE	42.6	9.6	6.2	70.6	44.0	14.6	28.0	34.4	8.4
II. TRANSFORMATIVE	59.3	40.0	22.9	70.4	64.3	37.9	11.1	24.3	15.9
III. DISTRIBUTIVE SERVICES	60.7	45.2	38.8	71.3	67.7	54.4	10.6	22.5	15.6
IV. PRODUCER SERVICES	80.5	64.1	71.0	86.1	70.1	79.2	5.6	6.0	8.2
V. SOCIAL SERVICES	79.3	65.5	59.7	85.0	73.3	67.4	5.7	7.8	7.7
VI. PERSONAL SERVICES	37.0	24.9	11.7	50.1	29.0	29.0	13.1	4.1	17.3
TOTAL	63.2	37.5	31.6	74.8	57.1	49.7	11.6	19.6	18.1

Females. The findings of educational attainment of women in the labor force are very similar to those of employed men. Black and Mexican American females in the labor force also have smaller proportions of employment with at least 12 years of schooling completed than do Anglo females. In relative terms, in 1970 there were 76 Black females for every 100 Anglo females with 12 years of schooling or more, with the corresponding proportion for Mexican American females being 66. These figures show, however, that minority females have higher educational attainment in relation to Anglo females compared with the relative educational attainment of minority males. (Incidentally, the findings in the prior chapter that females have higher educational attainment than males holds for all three ethnic groups, as revealed in Table VII-14.)

Again, the gap in educational attainment between Anglo females and Black and Mexican American females differs substantially by sector. In the Distributive sector, for example, hardly any difference existed in 1970 between Anglo and Black females in their proportion of employment with at least 12 years of schooling. As the share of employment of Black females in the Extractive sector and particularly in the Personal services sector, both characterized by a low degree of educational attainment, decreased substantially during the 1960-70 decade, the educational differential between Anglo and Black females became smaller. A similar trend can be observed for Mexican American females whose educational attainment approached that of Anglo females much more in 1970 than in 1960.

As we noted in the comparison of Black and Mexican American males, Black females, also, have a higher proportion of employment with 12 years of schooling or more than do Mexican American females. This holds for all industry sectors except in the case of Producer services.

The fact that Mexican Americans, for males as for females, have higher educational attainment in Producer services than Blacks is indeed interesting. This situation seems to be independent of the share of employment in these services for the two ethnic groups. In the case of males, Blacks are relatively more numerous in Producer services than Mexican Americans, whereas Mexican American females proportionately outnumber Black females in that sector. This again seems to suggest that education is not all that important as a determinant for the share of employment of a particular population in a given industry.

On the other hand, it can be expected that educational attainment is more closely related to the type of work, i.e., occupation. For example, professionals in general have a college degree. In that sense, the discussion in this section should lead us to expect that because of their higher educational attainment, Blacks in general will hold higher-status occupations than Mexican Americans. Moreover, the occupational status of both minorities will substantially be below that of Anglos. These expectations are examined in Tables VII-15 and VII-16.

Occupational Status

Males. "It is hardly surprising to find in Table VII-15 that Anglo males hold better positions than Black or Mexican American males, but it is impressive how this difference is maintained in all six industry sectors. For example, Anglos

Table VII - 15

OCCUPATION BY INDUSTRY SECTOR AND ETHNIC STATUS OF THE MALE LABOR FORCE: SOUTHWEST, 1960-1970

OCCUPATION	EXTRACTIVE			TRANSFORMATIVE			DISTRIBUTIVE SERVICES			PRODUCER SERVICES			SOCIAL SERVICES			PERSONAL SERVICES		
	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American
1960																		
Professionals, Sub-professionals, Managers	7.2	0.5	1.0	21.1	2.1	6.2	27.6	3.8	10.7	46.9	8.0	29.6	50.6	21.5	29.1	26.7	6.0	10.1
Clerical	1.2	0.3	0.1	5.7	2.7	3.8	8.4	4.9	8.9	12.4	3.2	11.2	14.1	16.3	13.0	2.7	0.2	1.0
Craftsworkers	6.9	1.3	1.4	35.6	18.0	26.3	16.5	7.8	14.1	5.3	8.0	8.4	11.0	7.8	15.8	24.6	10.5	18.5
Operatives	12.6	7.1	10.1	25.7	36.8	35.7	21.8	33.8	32.2	3.0	8.0	5.6	3.3	7.3	9.3	10.8	13.1	14.4
Sales, Service, Household Workers	0.6	1.0	0.3	5.5	7.7	2.4	20.3	23.0	14.3	31.1	67.2	34.6	18.1	36.6	22.8	29.3	51.0	46.1
Farmers	47.4	23.0	12.2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Laborers (inc., farm)	24.0	66.9	75.0	6.4	32.8	25.5	5.4	26.3	19.9	1.3	5.6	10.6	2.8	10.6	10.0	5.9	19.2	9.9
1970																		
Professionals, Sub-professionals, Managers	14.1	1.5	2.7	27.9	5.8	9.2	25.2	5.0	12.8	49.1	13.2	32.5	56.9	27.6	33.7	24.6	10.7	13.7
Clerical	2.2	2.4	1.0	5.8	4.6	4.6	8.6	10.6	8.7	12.1	12.0	17.5	12.0	20.0	14.4	3.6	1.6	2.4
Craftsworkers	11.1	4.8	5.6	35.1	23.7	32.7	17.7	13.5	17.6	5.0	8.9	6.6	7.5	8.6	11.8	22.2	17.3	17.4
Operatives	14.4	7.2	12.3	20.6	38.6	35.4	19.7	34.2	31.0	2.4	5.0	7.4	2.4	7.4	5.4	8.4	13.4	11.0
Sales, Service Household Workers	1.3	1.4	1.1	5.9	6.8	3.5	21.8	17.8	15.7	30.0	56.6	32.1	19.0	30.6	28.6	35.8	46.7	47.1
Farmers	30.9	9.2	7.3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Laborers (inc., farm)	27.4	73.4	70.1	4.7	20.6	14.7	7.0	18.9	14.3	1.4	4.3	3.9	2.3	5.9	6.1	5.5	10.3	8.4

are much more likely to be professionals and managers than either Mexican Americans or Blacks. Anglos are also more likely to be craftsmen, whereas Blacks and Mexican Americans are holding operative positions. (It is only in Producer and Social services, in which Professional and Service occupations are the model occupational categories, that Anglos are less likely to be craftsmen than either Blacks or Mexican Americans.) Moreover, Black and Mexican American males have much higher proportions employed as laborers than do Anglo males. This differentiation is the most pronounced in the Extractive sector in which at least 70 percent of Blacks and Mexican Americans were laborers and farm laborers in 1970, compared to only 27.4 percent of Anglos.

While these findings are not surprising and are consistent with the data reported in earlier sections of this chapter as well as with many studies about Black employment, the more interesting aspect concerns the comparisons of Mexican Americans and Blacks in terms of occupational status. As we stated earlier, the higher educational attainment of Black males would lead us to expect them to hold higher status occupations than Mexican American males. The data in Table VII-15, however, do not support this expectation. Despite their higher educational attainment, Black males generally are in lower-status positions compared with Mexican American males. In all sectors, there are proportionately more Mexican American professionals and managers than Blacks with these occupations. On the other hand, Black males are more represented as laborers than are Mexican American males. Thus it is not too surprising that in the one sector, Producer services, in which Mexican American males do have higher educational attainment than Black males, their occupational status is significantly better than that of Blacks.

Females. As among males, Anglo females hold higher-status positions than Black or Mexican American females (see Table VII-16). The differences, however, vary from sector to sector. Transformative industries, for example, employ Anglo and minority females in quite distinct ways. In 1970 close to one-half of Anglo females in this sector were employed in clerical positions, whereas over 70 percent of Black and Mexican American females were operatives. The increased share of employment of minorities in this sector thus involves largely the low-status, blue-collar position of operatives, with Anglos increasing their share in the clerical positions. On the other hand, the occupational distribution of employment in the Distributive sector is very similar for the three ethnic groups.

In general, the difference between Anglo and minority females in terms of occupational status is not as large as is the case of males. In other words, Black and Mexican American females are employed in better positions in relation to Anglo females compared with Black and Mexican American males in relation to Anglo males.

Turning our attention to the occupational differences between Black and Mexican American females, the situation differs from that of males. Females of both minority groups are employed in very similar occupations, save for the Extractive and Producer services sectors. In the Extractive sector, Mexican American females clearly occupy the lowest occupational status of the three ethnic groups: over three-fourths are employed as laborers and farm laborers. On the other hand, Mexican American females do better than Blacks in Producer services.

Table VII-16

OCCUPATION BY INDUSTRY SECTOR AND ETHNIC STATUS OF THE FEMALE LABOR FORCE: SOUTHWEST, 1960-1970

OCCUPATION	EXTRACTIVE			TRANSFORMATIVE			DISTRIBUTIVE SERVICES			PRODUCER SERVICES			SOCIAL SERVICES			PERSONAL SERVICES		
	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American	Anglo	Black	Mexican American
1960																		
Professionals, Sub-professionals, managers	3.8	---	---	7.3	1.0	1.8	9.4	6.7	5.6	12.0	3.0	8.1	50.3	34.2	22.7	10.9	1.4	3.4
Clerical	23.3	---	3.1	45.0	7.5	15.6	44.0	20.7	33.3	76.1	43.3	80.0	32.3	18.3	34.4	9.8	0.4	4.8
Craftsworkers	0.5	---	---	3.7	5.1	4.0	1.4	5.5	1.2	0.5	---	---	0.3	0.2	0.2	0.4	0.2	0.3
Operatives	3.2	2.4	7.0	40.0	70.7	73.5	5.7	8.5	17.1	1.0	4.5	3.1	1.0	2.8	3.8	7.8	8.8	14.6
Sales, Services, Household Workers	2.6	2.4	3.1	3.2	11.6	3.7	39.3	54.9	40.4	10.3	49.3	8.8	16.1	44.4	38.6	70.4	88.2	76.3
Farmers	20.8	21.4	2.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Laborers (including farm)	45.9	73.8	84.5	0.9	4.0	1.5	0.3	3.7	2.4	0.2	---	---	0.1	0.2	0.2	0.3	0.2	0.7
1970																		
Professionals, Sub-professionals, managers	8.5	8.0	0.6	10.5	2.9	2.5	9.4	4.6	7.4	16.0	5.1	10.0	48.0	30.1	28.7	9.3	3.6	4.7
Clerical	47.0	20.0	7.0	47.1	13.6	15.1	46.7	47.3	40.6	72.1	61.5	74.4	33.3	27.6	37.3	16.1	2.6	9.1
Craftsworkers	1.0	4.0	---	5.6	5.0	6.1	2.2	1.8	1.7	0.8	0.8	0.6	0.6	0.4	0.3	0.9	0.9	0.9
Operatives	2.9	---	9.9	33.8	73.4	72.6	5.3	6.8	15.4	1.0	2.1	2.4	0.7	1.5	1.8	4.9	7.8	11.5
Sales, Services, Household Workers	2.7	8.0	4.1	2.1	2.7	1.8	35.1	35.6	32.5	10.0	29.5	12.7	17.4	39.9	32.0	68.2	84.4	73.2
Farmers	13.7	8.0	1.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Laborers (including farm)	24.2	52.0	77.3	1.0	2.3	2.0	1.5	3.9	2.5	0.2	0.9	---	0.2	0.5	0.2	0.6	0.8	0.7

Although the findings for females do not show much difference between Blacks and Mexican Americans, it should be pointed out that this similarity is more characteristic of the 1970 employment pattern than that of 1960. Even in 1970, however, Black females are less likely to be in clerical positions than Mexican American females, and more likely to be operatives.

These findings support, mostly for males but to a lesser extent also for females, the belief that discrimination against a minority group which can be readily identified by physical characteristics, plays an important part in the employment of Blacks. The data presented here are too incomplete to address all the reasons that could account for the difference in occupational status between Blacks and Mexican Americans. But it cannot be discarded that Mexican Americans as a minority group are less readily identified (which is one of the reasons why we do not have more data about this population group). After all, Mexican Americans are classified as whites by the Bureau of the Census. Thus, their employment "blends in" more easily with that of Anglos than in the case of Blacks. At this point, the interpretation of the employment differentials between Blacks and Mexican Americans must remain fragmentary, but the data presented here demonstrate that much could be learned about the employment pattern of minorities by a detailed comparative study including at least the two largest minorities in the United States, Blacks and Mexican Americans.

Chapter VIII

EARNINGS DISPERSION AND THE SECTORAL PATTERN OF EMPLOYMENT

In the last three chapters we have considered how industries differ in terms of their occupational requirements and how these sectors and industries differ in the way in which they utilize females and minorities. We have also established that the scheduling of work differs substantially from one industry to another. Although the mean number of year-hours per worker was quite similar across industries, some industries had a high proportion working a standard work week, while other industries employed large proportions of part-time workers in addition to those persons working more than full time. Moreover, the continuity of employment differs among industries. In some, persons predominantly work the entire year, whereas in others there is much intermittent employment.

All of these factors ultimately are reflected in monetary terms. Professionals have higher earnings than operatives, females earn less than males, blacks less than whites, and persons working full time the entire year receive more earnings than those working intermittently. In a fundamental and very real sense, therefore, earnings -- and given our concern with the labor force we necessarily must speak of earnings rather than income -- represent an extremely important "outcome" of the sectoral and industry distribution and of the entire sectoral transformative process.

Since our orientation throughout this report has been on a macro level, we do not take the earnings of particular individuals and relate them to other personal characteristics; rather, our concern is with the distribution or dispersion of earnings. Within this context we can expect the changes in the industry structure of employment between 1960 and 1970 to have had an impact on the dispersion of earnings for both the total employed labor force as well as for the four sex-race groups we have had occasion to examine. Unlike previous chapters which emphasized the demographic and sociological features of the sectoral transformation, the approach of this chapter is very much economic in concept and methodology.

This chapter will address the significance of earnings dispersion as part of the developmental process, an evaluation of the industry sector versus human capital approaches in accounting for the change in earnings dispersion 1959-1969, and the patterns of earnings dispersion by sector and industry when disaggregated into the four race-sex groups.

EVALUATING THE SECTORAL AND HUMAN CAPITAL APPROACHES TO EARNINGS DISPERSION

One of the standards by which economies are judged is the equity with which its product is shared by its participants. Although defining an "equitable" distribution of income is a normative problem on which it may be difficult to achieve concensus, in most practical circumstances the issue facing the government and its citizenry is whether the existing distribution should be made more or less equal, and how this objective can be accomplished. Since most economies are continually changing in structure and size, a precondition for successful policy-making in this area is an understanding of how the forces already at work in an economy affect its income distribution.

In modern economic thinking there has been a tendency to separate questions regarding the efficiency with which resources are allocated from inquiries into the criteria by which the product resulting from a particular allocation is distributed. The basis for this dichotomy has been the belief that there always exists some combination of taxes and transfers that can translate the results of the market allocation process into the desired distribution of income. Although this is true in principle, the government has done little to alter the marked-determined distribution of income.

The problems involved in using tax and transfer programs to achieve an income distribution that departs markedly from the one resulting from the market allocation process have been ably stated by Thurow (1972: 6):

> Although there are no technical difficulties in reaching any desired distribution of income from any market distribution of income with tax and transfer policies, large overt redistributions of income from one individual to another may be difficult to achieve politically. This may be especially true if those to be aided are in the minority. Taxpayers may well be willing to help low income individuals earn a larger income but unwilling to give low income individuals a higher income. From the point of view of self-respect, low income individuals may also wish to be aided indirectly rather than directly. They may wish to "earn" their own living. (emphasis added).

For many people, interest in the question of income distribution is prompted by the belief that the inequality in incomes in the United States and elsewhere differs from their judgment as to what an equitable distribution of income should be. While there are undoubtedly some who would argue for a greater range in incomes, presumably to generate greater incentives in the market place, it seems fair to characterize the sentiment of the majority as preferring greater to lesser equality.

While Thurow and others have investigated the effects that would accompany variations in the distribution of education and training opportunities available to the population, there is another, and perhaps older, tradition in the literature which focuses on the income distribution effects accompanying economic development. Here economic development is taken to mean not simply a rise in per capita income, but the entire change in the economic and social fabric of a society that usually occurs as development proceeds. This section of the report examines the relationship between the industry structure of employment and the distribution of earnings. Although the analysis relies on relatively recent data for the United States, it is believed that some of the questions investigated are of sufficient generality as to be relevant to a broader, more historical, context. We begin with a brief review of the literature.

The view of the relationship between economic development and income inequality that emerges from the data that have been surveyed is ambiguous.

International cross-sectional data tends to indicate that income inequality is less in countries at higher stages of development (Lydall, 1968); however, longitudinal studies do not present such a clear picture, for in some of the developed countries studied by Lydall in the twentieth century, earnings inequality failed to decline at all as development proceeded. In any event, these correlations are "gross" and fail to indicate whether it is development *per se* (as measured, for example, by higher levels of income per capita), or other concomitants of growth that are associated with the smaller dispersion in earnings among more developed countries. Indeed, Chiswick (1971) presents evidence that economic development exerts *no* effect on inequality independent of its influence on the distribution of schooling and the rate of economic growth. However, the relevance of this distinction is questionable. The term economic development, as opposed to economic growth, usually refers to the amalgam of change (demographic, economic, and institutional) that typically occurs in the course of raising the level of well-being of a population. Consequently, one suspects that most students of development would be rather critical of the use of per capita GNP to summarize a country's state of development. On the other hand, the question of the paths through which economic development affects the income or earnings distribution is a highly interesting one.

Kuznets (1955, 1966) had earlier researched this question. In comparing differences in income inequality between nations, Kuznets emphasized that differences in productive structure were a major explanatory factor. He suggested that the way in which countries developed had a major influence on the income distribution. The hypothesis he advanced is that earnings distribution in manufacturing industries tends to be more unequal than the earnings distribution in agriculture. Thus, as the labor force shifted toward more employment in industry, the aggregate concentration of income was expected to increase. He predicted that later stages of development would bring about greater equalization within industry and therefore, a lessening of inequality to the level characteristic of more developed countries. Since further study failed to bear out this generalization, Kuznets (1971) shifted his attention toward *inter-* rather than *intra-*sectoral differences in earnings. Many underdeveloped countries are characterized by enormous variation in output per worker between industry, agriculture, and services. Thus, Kuznets argued that only as sectoral productivity levels began to converge would incomes also converge. The United Nations Economic Commission for Latin America (1972), Langoni (1973) and Fishlow (1973), also have emphasized the sectoral pattern of employment and the distribution of earnings among sectors as important factors in understanding comparative inequality among nations.

In the spirit of the studies cited above, the analysis of U.S. census data is directed towards determining the effect of the sectoral pattern of employment on earnings inequality within the United States. It is generally believed that in an economy where most prices are market-determined, the earnings distribution, which is a major component of the income distribution, depends on the industrial pattern of final demand and the distribution of marketable skills among the population. Although there is no necessity to regard these determinants of earnings distribution as competitive, they have rarely been synthesized into a pluralistic model of earnings determination. Rather, one can identify, on the one hand, what we shall call a sectoral approach to the earnings distribution and, on the other hand, a human capital approach to this question. In its extreme version, the sectoral position, which we associate with the work of Clark and Fisher, assumes that the distribution of earnings primarily reflects the allocation of employment among the three sectors of the economy, the primary, secondary, and tertiary. In essence the distribution of earnings within each sector is regarded as an intrinsic, unchanging, characteristic, with the pattern of final demands for goods and services determining the sectoral pattern of employment. Thus we have a theory of the earnings distribution that places great weight on the nature of aggregate demand.

In contrast, the human capital approach (Becker, 1964; Mincer, 1974) is a supply-side theory of the earnings distribution. Advocates of this viewpoint see the earnings distribution as a reflection of the skill-mix of the labor force and the rates at which these skills are rewarded. Studies which use this approach to project changes in the earnings distribution have assumed that the returns to the productivity-related characteristics of workers are constant over time and thus changes in the distribution of earnings are regarded principally of changes in the distribution of labor force skills (Chiswick and Mincer, 1972).

These approaches to analyzing the earnings distribution naturally lead to different perceptions about which policies will be most successful in effecting the desired distribution of earnings. Adherents to the sectoral approach are likely to advocate policies that alter the speed or the pattern of growth by which an agrarian economy transforms itself into an industrial or service economy. An important issue for these advocates might be the relative advantages of a program of rural versus urban industrialization. Human capital theorists, on the other hand, have focused on the role of education in economic development and have considered the consequences of altering both the distribution of educational expenditures and the average level of education for the earnings distribution. Given these diverse approaches to the analysis of the earnings distribution, we believe the data to be examined bears not only on the usefulness of each approach as a predictive device but also has implications regarding the appropriate focus of public policy.

We propose to evaluate the merits of these two approaches to analyzing the earnings distribution by comparing how well they predict the changes in the dispersion in earnings in the U.S. that occurred between 1959 and 1969. In addition, we will suggest how the sectoral and human capital approaches can be combined into a single model which we will evaluate relative to either of the two simple approaches.

The earnings distributions we consider here apply only to white and black males, although at a later point we shall introduce race and sex data. The data we employ are the same as used throughout this report (see Appendix A), but for this section, we chose a 10% sample of white males from the original sample. All blacks, however, were included. Female workers were excluded because of data considerations. These data are poorly suited for the analysis of the earnings distribution among women in the human capital framework because of the emphasis this approach places on labor force experience and post-school investment. These data are not explicitly reported by the census, but in the case of males they are usually inferred by assuming that individuals participate in the labor force continuously after leaving school. However, in the case of women, where an intermittent pattern of labor force participation for purposes of child bearing and child rearing is well documented (Mincer and Polacheck, 1974), this assumption is clearly inappropriate. Because there is no alternative way of measuring labor force experience we find satisfactory, women have been excluded from the analysis. Our decision to consider white and black males separately is based on repeated findings that the structure of the human capital earnings functions estimated for each group differ markedly (Weiss, 1970; Harrison, 1973).

Because it is crucial that we be able to identify a worker's sector of employment, we have adopted sampling criteria that are different from those used in most previous analyses of U.S. Census data. Specifically, we have selected only those workers classified as employed and "at work" or "with a job but not at work" due to illness or vacation. Excluded from the sample are persons who are unemployed or nonparticipants in the labor force.

One implication of this selection procedure is that the difference in the rates of return to schooling between blacks and whites is far less than that reported in other studies. The reason is that the lower rates of return to schooling usually estimated for blacks occur, in part, because increased education does not insulate blacks from unemployment as effectively as it does whites. As a result, even if schooling increases the rate of pay of blacks to the same extent as it does for whites, the rate of return to schooling would not be as great for blacks, since the amount of time they work at this higher rate does not increase the same. By limiting the analysis to employed persons we have removed the employment advantage experienced by educated whites which tends to equalize rates of return.

A second property of the data must also be noted. There is a lack of congruence between the time period to which the earnings data refer and the time period reflected in the data on industry of employment. Because the earnings data describe annual earnings, they refer to the calendar years 1959 and 1969. In contrast, the data on industry of employment are reported for the reference dates of the censuses, which were conducted in April of 1960 and 1970. Thus the observations for industry and employment data do not coincide in time. Although there is an obvious potential for bias in this procedure, in that some males have different industry employment at the time of the census than they did during the prior year for which their earnings were reported, we have no way of knowing the directions or magnitudes of the biases and therefore have not attempted to "correct" the data.

The sectoral approach we are evaluating considers the industry pattern of employment as central to the distribution of earnings. That this type of analysis traditionally has been in terms of sectors rather than of industries surely reflects the paucity of good data as much as it does the judgement that sectors, rather than industries, are the appropriate units of analysis. The six-sector classification that has been used throughout the report is employed here.

The socioeconomic characteristics of the labor force that we consider are few in number and are dictated by the human capital models we employ, as developed principally by Mincer (1974). These models will be elaborated in the following section.

There is, of course, no entirely satisfactory way to summarize a complete earnings distribution by means of a single statistic. Each of the various measures that have been proposed, such as the Gini coefficient, the coefficient of variation, and the variance of the natural logarithm of earnings, have characteristic features that make them more sensitive to certain changes in the distribution than to others. (An evaluation of various measures of dispersion in terms of their implicit normative criterion and their sensitivity to specific changes in the distribution has been done by Atkinson, 1970).

The measure used here, the variance of the natural logarithm of earnings, has several desirable properties that commend it above alternative summary statistics. First, by virtue of the use of logarithms, it is a relative measure of dispersion. This means that proportional changes in earnings over time have no effect on this statistic. This is desirable, for we would not wish to confound purely inflationary effects with real changes in the distribution of earnings. This property also is relevant when making international comparisons, since it implies that this index of dispersion does not depend directly on the value of any country's currency. In addition, the implications of the human capital approach regarding the effects of changes in the distribution of the skills on the dispersion in earnings are most easily expressed in terms of the variance of the natural logarithm of earnings, hereafter referred to as log-earnings. (This derivation appears in Chiswick, 1974 and Mincer, 1974.) Let us now consider how well the approaches we have discussed explain changes in the variance of log-earnings between 1959 and 1969.

Changes in the Variances of Log Earnings: 1959-1969

The variances of the natural logarithm of earnings of males 16 years of age and above, classified by race and sector of employment appear in Table VIII-1. The statistics for the entire labor force by race are reported in the first row of the table. Note that in each racial group the dispersion in earnings declined between 1959 and 1969, the larger change occurring among black males. Our objective in this section of the paper is to consider the reasons for these changes in earnings dispersion.

We first consider how far the simple versions of the sectoral and the human capital hypotheses will take us. The sectoral position can be stated more concretely with reference to the data in Tables VIII-1 and VIII-2. We interpret the structuralists as arguing that the dispersion in earnings within a sector can be regarded as a characteristic that is intrinsic to that sector, at least over a period as brief as a decade. A less rigid version of this position is that relative to the changes in the dispersion in earnings within sectors, the movement of workers among sectors is a much more significant component of the change in earnings dispersion.

A cursory examination of Tables VIII-1 and VIII-2 lends support to this view. The rankings of the sectors between 1959 and 1969 appear rather consistent. The Extractive sector and Personal services usually have the greatest earnings dispersion and these sectors have been employing a decreasing share of the labor force. The sectors in which earnings are less dispersed are the Transformative and Social service sectors. The latter especially has increased its share of employment over the decade. These observations suggest that the sectoral view has promise, since the movement of workers from sectors

Table VIII-1

VARIANCE OF THE NATURAL LOGARITHM OF EARNINGS BY RACE AND SECTOR OF EMPLOYMENT, 1959 AND 1969

	White Males		Nonwhite Males	
	1959	1969	1959	1969
All sectors	1.308	1.202	1.318	1.042
Extractive	2.635	2.522	2.069	1.653
Transformative	.768	.750	.812	.729
Distributive services	1.235	1.211	.931	1.027
Producer services	1.207	1.365	.900	1.067
Social services	1.017	1.041	.762	.991
Personal services	1.763	1.937	1.361	1.545

Table VIII-2

THE SECTORAL DISTRIBUTION OF MALE WORKERS, 1960 AND 1970, BY RACE

Sector	White Males		Nonwhite Males	
	1959	1969	1959	1969
Extractive	.102	.062	.138	.061
Transformative	.427	.411	.385	.418
Distributive services	.228	.239	.190	.201
Producer services	.060	.073	.030	.048
Social services	.116	.149	.134	.180
Personal services	.067	.065	.122	.092
	100.0		100.0	

with a large dispersion in earnings to sectors with low dispersion is consistent with the overall decline in the variance of log-earnings.

The sectoral position can be evaluated quantitatively if we take the mean levels and variances of the natural logarithm of earnings prevailing in each sector in 1959 as typical of the relative dispersion in earnings in that sector. The data in Table VIII-2 indicate the changing weights to be attached to these means and variances in order to predict the change in earnings dispersion between 1959 and 1969.

The total variance in log-earnings within each racial group can be analyzed into within-sectors and between-sectors components as in an analysis of variance. The within-sectors variance is simply the weighted average of the variance in each sector, the weights being the proportion of persons employed in the given sector. Thus, it is easy to see how the changes in sectoral weights between 1959 and 1969, which placed increasing weight on sectors with less dispersion, could reduce the within-sector variance in log-earnings.

In contrast, it might seem inappropriate to hold the sectoral means constant over the decade in order to compute the change in the between-sectors variance, since it is obvious that mean earnings in each sector have risen as a result of economic growth and inflation. However, the fact that the variance of the natural logarithm of earnings is independent of scale implies that the between-sector variance, obtained by weighting the squared deviations of the sectoral means from the grand mean of earnings, will be insensitive to proportional changes in the arithmetic mean in each sector. Therefore, the assumption that the mean level of log-earnings in each sector is constant over the decade is weaker than it may appear, for it implies only that the average rate of increase in earnings is constant across sectors. We predict the expected change in the between-sector dispersion in earnings between 1959 and 1969 by assuming the mean of log-earnings to be constant in each sector and varying the sectoral weights. We first calculate the new grand mean and then sum the weighted squared deviations of the sectoral means from the new grand mean. These estimates of the predicted values of the between- and within-sector dispersion in earnings in 1969, along with the actual values calculated for 1959 and 1969, appear in Table VIII-3.

For each racial group the major component of earnings dispersion is the within-sector variance, accounting for around 90 percent of the total variance in earnings. Although the proportions of the variance in log-earnings occurring within and between sectors will of course depend on the fineness of the sectoral groupings, the general impression conveyed by the data in Table VIII-4 is that they are not likely to be sensitive to the particular aggregates chosen, within the range of detail provided by the census data. To illustrate, we calculated the within-group variance when workers were allocated to the 37 industries used in the report. We found that the within-industry variance was nearly as large as the within-sector variance, being no less than 80 percent of the total variance in log-earnings for each racial group.

These findings indicate that to explain the causes of earnings dispersion at a moment in time one must have a theory of the within-sector variance in earnings. However, it does not follow that the within-sector component looms so large in the explanation of the change in earnings dispersion. In fact, for

Table VIII-3

PREDICTED AND ACTUAL VALUES OF VARIANCES IN LOG-EARNINGS BY RACE, 1959-1969: THE SECTORAL APPROACH

Race - Sex Group	1959 Actual	1969 Predicted	1969 Actual	Predicted Change 1969 - 1959	Actual Change 1969 - 1959
White Males					
Total variance	1.308	1.221	1.202	-.087	-.106
Within sectors	1.187	1.131	1.137	-.056	-.050
Between sectors	.121	.091	.065	-.031	-.056
Nonwhite Males					
Total variance	1.318	1.096	1.042	-.223	-.277
Within sectors	1.071	.958	.975	-.114	-.097
Between sectors	.247	.138	.067	-.109	-.180

nonwhite males, the change in between-sector dispersion in earnings exceeded the change in the within-sector component by a factor of two. In other words, while the sectoral approach would do poorly as an explanation of the cross-sectional dispersion in earnings, since it regards the within-sector dispersion as exogenous, it may still be a good predictor of changes in earnings dispersion.

Let us now see how consistent these changes are with the predictions of a sectoral model that attributes the change in earnings dispersion within racial groups entirely to the weights assigned to each sector. The relevant statistics appear in columns (4) and (5) of Table VIII-3. In general, the sectoral approach underpredicts the reduction in earnings dispersion that occurred between 1959 and 1969. It accounts for 82 percent of the change among white males, and 81 percent of the change among black males.

The sectoral calculations underpredict the reductions in the between-sector component of earnings dispersion most seriously. For both white and black males the model predicts roughly 60 percent of the actual reduction in the between-sector variance. Evidently the assumption that the change in mean earnings in each sector increased at an equal rate between 1959 and 1969 is inappropriate. Since the sectoral approach, as we have formulated it, offers no explanation as to why relative changes in mean earnings may vary among sectors, it could, in principle, be dominated by one which considers how mean earnings are determined in each sector.

The human capital approach discussed above has the potential to account for the kinds of changes in the earnings distribution described in Table VIII-[illegible]. Put simply, this approach seeks to determine the market prices paid for the various productivity-related characteristics of workers and to explain the level and distribution of earnings in terms of the distribution of these characteristics among the labor force. By holding these prices constant, the effects of changes in sectoral means and variances, to the extent they reflect changes in the characteristics of the labor force, can be captured by this approach.

We maintain our stratification of the labor force by racial groups and estimate separate earnings equations for each one. The general form of the earnings equation is:

$$(1) \quad \ln Y = b_0 + b_1 S + b_2 Ex + b_3 \ln (Wks) + u,$$

(See Mincer, 1974, for the derivation of this equation.)

where the dependent variable is the natural logarithm of the individual's annual earnings, S is the person's educational attainment, Ex is years of labor force experience, ln (Wks) is the natural logarithm of the number of weeks the individual worked during the year, and u is a disturbance term, assumed to have the appropriate properties.

An expression for the variance of ln (Y), our index of dispersion, can be derived straightforwardly from equation (1) and appears as follows:

$$(2)\quad \mathrm{Var}\ \ln(Y) = b_1^2\ \mathrm{Var}(S) + b_2^2\ \mathrm{Var}(Ex) + b_3^2\ \mathrm{Var}(\ln Wks) + 2b_1b_2\ \mathrm{Cov}(S, Ex) + 2b_1b_3\ \mathrm{Cov}(S, \ln Wks) + 2b_2b_3\ \mathrm{Cov}(Ex, \ln Wks) + \mathrm{Var}(u).$$

This specification departs in a minor way from Chiswick and Mincer's model (1972) by treating the rates of return to schooling and experience as parameters and not random variables. However, the results reported by Chiswick (1974) provide some justification for these modifications, for he obtains an inappropriate sign for the additional variables he includes in his equation under the assumption that rates of return are random variables.

Table VIII-4 reports the estimates from the 1959 data of equation (1) for males of each race. These equations fit the data reasonably well, the R^2 typically being around .30; all variables are significant and have the anticipated signs. We hesitate to compare the coefficients in Table VIII-4 to those reported for these groups by other writers because, as noted above, we have defined our sample somewhat differently.

Nevertheless, our results can be used to predict how the dispersion in earnings within similarly defined groups would change in response to changes in the distribution of labor force characteristics between 1959 and 1969. This calculation is performed using equation (2). The independent variables in this equation were assigned values obtained from the 1970 census; the regression coefficients and the variances of the error terms, assumed to remain constant between 1959 and 1969, were given the values reported in Table VIII-4.

Table VIII-5 compares the actual changes in earnings dispersion that occurred between 1959 and 1969 with those changes that were predicted by the method described above. In general, the human capital model does poorly. The narrowing of the distribution of earnings is underpredicted for both racial groups and the model does most poorly in the numerically important category of white males.

While these results are hardly supportive of the human capital approach, they do not constitute a complete test of the model. This is because previous work (King, 1975) has indicated that a principal reason for the model's failure is that a major source of change in the earnings distribution over the decade is attributable to changes in the residual variance. Since the way we have expressed the model assumes the residual variance to be constant between 1959 and 1969 it is unable to capture the effects of these changes. Whether this is a shortcoming of the model depends on whether one believes changes in the residual variance are exogenous or endogenous to the human capital framework. Mincer (1974), for example, has argued strongly that changes in the residual variance are explicable within the context of the human capital model and has presented considerable evidence to that effect.

Table VIII-4

ESTIMATES OF EARNINGS FUNCTIONS FOR MALES BY RACE, 1959

Race	Constant	Schooling	Experience	Log of Weeks Worked	R^2	Standard Error Of Estimate	Degrees of Freedom
Whites	-2.301	.092[a] (.002)	.011 (.0004)	1.219 (.012)	.300	.956	38,158
Nonwhites	-2.031	.097 (.002)	.013 (.0004)	1.033 (.010)	.303	.959	37,624

[a] All variables are significant at .01 level.

Table VIII-5

COMPARISON BETWEEN ACTUAL CHANGES IN THE VARIANCE OF LOG-EARNINGS 1959-1969 AND CHANGES PREDICTED BY HUMAN CAPITAL MODEL

Race	Variance 1959 (Actual)	Variance 1969 (Actual)	Variance 1969 (Predicted)	Actual Change 1969-1959	Predicted Change 1969-1959
Whites	1.308	1.202	1.307	-.106	-.001
Nonwhites	1.318	1.042	1.263	-.276	-.055

Unfortunately, it is difficult to specify *a priori* how the residual variance will change in response to complex changes in the characteristics of the labor force. As a result, we are led to adopt an *ad hoc* procedure to investigate the relationship between the residual variance and labor force characteristics. We express the residual variance as a function of the means and variances of, and covariance among, schooling and experience, as suggested by Mincer's work. Because the changes in the residual variance that we wish to explain occur over time, we will estimate the hypothesized relationship using cross-sectional data (the 37 industries are the units of observation) in order to assure the independence of the data used to estimate the relationship and the data that provide the test for the model.

The equation we estimate has the form

$$(3)\quad \text{Var}\ (u) = d_0 + d_1\ \bar{S} + d_2\ \text{Var}\ (S) + d_3\ \overline{Ex} + d_4\ \text{Var}\ (Ex) + d_5\ \text{Cov}\ (Ex,\ S) + e,$$

and is estimated across two groups of 37 industries. To provide the dependent variable for this equation, equation (2) was estimated for members of each racial group in each industry, using the 1960 Census data. The estimated variance of the error terms in each industry equation then serves as the dependent variable in equation (3). The estimated equations appear in Table VIII-6.

We utilize the results in Table VIII-6 to estimate the change in the residual variance in earnings between 1959 and 1969 that is likely to have occurred in response to changes in labor force characteristics between these years. This is perhaps an extreme measure of the endogeneity of the residual variance,but it should serve to place an upper bound on the explanatory potential of the human capital approach. We estimate the change in the residuals for white and black males.

Our results indicate that the predicted change in the residual variance is -.121 for white males and -.430 for black males. When these predictions are combined with those derived from the deterministic part of the human capital model, the modified predictions are a decline of -.122 compared to the actual change of -.106 for white males and -.488, compared to the actual change of -.276 for black males. We see that treating the residual variance as endogenous greatly improves the predictive ability of the labor force approach in the case of white males, and has a marginal effect on the accuracy of the model when applied to blacks. This causes us to doubt the usefulness of the procedure we have employed and leads us to question just how large is the systematic component of the residual variance.

We turn next to consider whether the human capital and the sectoral approaches can be combined to improve the accuracy with which changes in earnings dispersion are forecast. We do this by estimating earnings equations, such as equation (2), that are specific to each sector. This method should dominate the sectoral approach since it enables us to dispense with the assumption that the dispersion in earnings within sectors is constant over time and permits different rates of change in the mean level of earnings in each sector. It should also be superior to the aggregate human capital approach, since it makes a weaker assumption regarding the parameters of the model. It assumes only that the

Table VIII-6

THE DETERMINANTS OF THE RESIDUAL VARIANCE IN LOG-EARNINGS WITHIN INDUSTRIES, 1960

Racial Group	Constant	Schooling Mean	Schooling Variance	Experience Mean	Experience Variance	Covariance Schooling, Experience	R^2
Whites	-3.351	.089* (.034)	.069 (.037)	.076** (.021)	.007** (.001)	.048** (.018)	.605
Non-whites	-.161	-.032 (.032)	.029* (.014)	.010 (.016)	.004** (.001)	.016 (.009)	.470

* denotes coefficient is significant at the .05 level.

** denotes coefficient is significant at the .01 level.

model's parameters are constant within sectors, which in principle permits the parameters of the aggregate earnings equation to vary over time in response to changes in the sectoral distribution of employment.

Once again we disaggregate the change in earnings dispersion into within- and between-sector components. The predicted within-sector change in the earnings distribution is obtained by means of equation (2). The sector-specific parameter estimates for this equation were obtained from the earnings functions in Table VIII-7. The parameters are once again held constant at their 1959 levels and the distribution of labor force characteristics is permitted to vary between 1959 and 1969. The predicted change for each racial group appears in Table VIII-8.

The intersectoral change in earnings dispersion is estimated by using the equations in Table VIII-7 to predict the mean level of log-earnings in each sector in 1969, given the 1959 parameters and the observed qualitative changes in the sector's labor force over the decade. Using these new sectoral means, a grand mean is calculated using the 1969 sectoral weights, and the deviation of the sectoral means from the grand mean is squared and the weighted sum taken over all sectors. The predicted change in intersectoral inequality is also entered in Table VIII-8 and can be compared to the actual change that occurred during the decade. The table also reproduces the results for the simple sectoral and human capital approaches discussed above.

The combined sectoral-human capital model severely underpredicts the reduction in earnings dispersion between 1959 and 1969. Most serious is its failure to account for the reduction in the between-sector variance over the period for either whites or blacks. The model predicts a negligible change in between-sector earnings dispersion when in fact there were significant reductions, especially among black males. If we compare these between-sector results to those obtained for the simple structural model, we find that the structural model outperforms the combined model. Evidently, the assumption of proportional changes in sectoral means is closer to the truth than the estimates obtained through the use of the human capital model, despite the fact that the latter takes explicit account of changes in the skill mix.

Although the combined model predicts the change in the between-sector variance more accurately, the change in the between-sector variance still suffers in comparison with the simple sectoral model. Since the combined model differs from the sectoral model by predicting changes in sectoral earnings dispersion rather than assuming it to be constant, it must be the case that the human capital approach is on average underpredicting the reduction in earnings dispersion within each sector. This may occur because the estimates reported in Table VIII-8 were obtained by constraining the residual variance in each sector to be constant over the decade. We will now relax this constraint and observe if there is a significant improvement in the performance of the combined model.

Reported in Table VIII-6 are the equations we estimated to predict the residual variance in earnings within an industry, for males of both races. These equations are now employed to predict the expected change in the residual variance within each sector by the following method. The residual variance

Table VIII-7

ESTIMATES OF EARNINGS FUNCTION BY SECTOR OF EMPLOYMENT AND RACE, 1959

Sector and Race	Constant	Schooling	Experience	Log of Weeks Worked	R^2	Standard Error Of Estimate	Degrees Freedom
Extractive							
Whites	-1.451	.103[a] (.009)	.015 (.002)	.746 (.048)	.112	1.530	3,890
Nonwhites	-1.685	.090 (.007)	.018 (.001)	.663 (.033)	.122	1.348	5,191
Transformative							
Whites	-2.029	.084 (.002)	.014 (.0001)	1.205 (.014)	.392	.684	16,294
Nonwhites	-1.362	.073 (.002)	.014 (.001)	.981 (.013)	.351	.726	14,489
Distributive							
Whites	-2.355	.081 (.004)	.012 (.001)	1.263 (.022)	.354	.893	8,697
Nonwhites	-1.319	.063 (.003)	.014 (.001)	1.081 (.019)	.380	.760	7,162

[a] All variables are significant at the .01 level.

Continued ....

Table VIII-7 (Continued)

ESTIMATES OF EARNINGS FUNCTION BY SECTOR OF EMPLOYMENT AND RACE, 1959

Sector and Race	Constant	Schooling	Experience	Log of Weeks Worked	R^2	Standard Error Of Estimate	Degrees of Freedom
Producer services							
Whites	-2.641	.088	.005	1.391	.258	.946	2,296
		(.007)	(.001)	(.060)			
Nonwhites	-1.332	.068	.002	1.013	.303	.793	1,116
		(.007)	(.001)	(.053)			
Social services							
Whites	-2.728	.078	.010	1.366	.288	.851	4,417
		(.004)	(.001)	(.039)			
Nonwhites	-1.707	.069	.008	1.094	.359	.698	5,044
		(.002)	(.001)	(.024)			
Personal services							
Whites	-2.394	.068	.008	1.266	.346	1.074	2,544
		(.008)	(.001)	(.038)			
Nonwhites	-2.014	.058	.007	1.105	.352	.939	4,602
		(.005)	(.001)	(.024)			

Table VIII-8

COMPARISON OF PREDICTED CHANGES IN EARNINGS DISPERSION 1959-1969

Racial Group	Actual Change	Predicted Combined Sectoral and Human Capital Approaches	Predicted Sectoral Approach	Predicted Human Capital Approach
White males				
Total variance	-.106	-.023	-.087	-.001
Within sectors	-.050	-.015	-.056	
Between sectors	-.056	-.008	-.031	
Nonwhite males				
Total variance	-.277	-.033	-.223	-.055
Within sectors	-.097	-.021	-.114	
Between sectors	-.180	-.012	-.109	

"within-sectors" is a weighted average of the sector-specific residual variance:

$$(4)\quad \text{Resid} = \Sigma_i\, f_i\, \text{Resid}_i$$

where f_i is the proportion of the labor force employed in a given sector. The change in the residual variance may therefore be expressed as

$$(5)\quad \text{Resid} = \Sigma_i f_i\, \Delta\, \text{Resid}_i + \Sigma_i\, \text{Resid}_i\, \Delta f_i.$$

The change in the residual variance in each sector for each race was predicted using the equations reported in Table VIII-6. These predicted changes were aggregated using the 1960 sectoral employment weights, forming the first term on the right-hand side of equation (3), and the second term was obtained using the 1960 sectoral residuals and the change in sectoral employment weights between 1960 and 1970.

These calculations predict a change of -.175 in the residual variance for white males and -.059 for black males. Combining these results with those reported in Table VIII-8, we find that the combined human capital-sectoral approach grossly overpredicts the reduction in within-group earnings inequality among white males, -.183 compared to the actual change of -.056, but comes rather close to the actual change in the within-sector dispersion among black males, -.081, compared to the actual change of -.097. This is virtually the opposite pattern of accuracy exhibited by the aggregate human capital model.

It should be remarked, however, that even if treating the residual variance within sectors as endogenous would enable us to perfectly predict the change in the within-sector dispersion in earnings, the poor performance of the combined model in predicting changes in the between-sector variance would severely limit its general accuracy. Indeed, the simple sectoral approach outperforms the combined approach by such a large margin that even with perfect prediction of the change in the residual variance within sectors the combined model would do just marginally better than the sectoral model, and then only for white males.

SECTOR AND INDUSTRY DIFFERENCES IN EARNINGS DISPERSION

The prior discussion suggests that the general assumption of the human capital model to consider the returns on weeks worked, experience, and education as constant across industries is not warranted when changes in the dispersion of earnings over time are to be explained. The preceding section demonstrates that the sectoral approach yields predictions about changes in the dispersion of earnings that are superior to those obtained from the human capital approach. In other words, as the allocation of employment to industries changes, it can be expected that there are also changes in the dispersion of earnings for the total labor force, since the variance of earnings within industries differs from one industry to another. In order to illustrate how the sectoral transformation of the labor force affected changes in the dispersion of earnings between 1959 and 1969, the dispersion of earnings for sectors and industries are discussed in the present section.

The differences in the variance of earnings among sectors seem fairly stable (Table VIII-9), since they persist across each of the race-sex categories

Table VIII-9

VARIANCE OF EARNINGS BY INDUSTRY SECTOR, INTERMEDIATE INDUSTRIES, ETHNIC STATUS, AND SEX, 1959-1969

Sectors and Industries	White Males		Black Males	
	1959	1969	1959	1969
I. EXTRACTIVE	*2.655*	*2.522*	*2.069*	*1.653*
1) Agriculture	2.740	2.814	2.036	1.661
2) Mining	1.035	.619	.851	.578
II. TRANSFORMATIVE	*.768*	*.750*	*.812*	*.729*
3) Construction	.985	.870	.950	.922
4) Food	.852	.717	.810	.714
5) Textile	.603	.824	.560	.623
6) Metal	.460	.483	.390	.551
7) Machinery	.470	.492	.535	.515
8) Chemical	.366	.403	.630	.639
9) Misc. manufacturing	1.108	1.150	.918	.776
10) Utilities	.318	.575	.467	.610
III. DISTRIBUTIVE SERVICES	*1.235*	*1.211*	*.930*	*1.027*
11) Transportation	.761	.708	.684	.778
12) Communication	.425	.514	.797	1.062
13) Wholesale	1.125	.950	.745	.839
14) Retail	1.476	1.491	1.090	1.200
IV. PRODUCER SERVICES	*1.207*	*1.365*	*.988*	*1.067*
15) Banking	.812	1.069	.534	.746
16) Insurance	.739	.669	.841	.852
17) Real Estate	1.868	1.738	.856	.924
18) Engineering	.911	1.100	.964	.802
19) Accounting	1.372	1.937	.571	.764
20) Misc. business serv.	1.383	1.583	1.126	1.341
21) Legal services	1.524	2.200	.896	1.247
V. SOCIAL SERVICES	*1.017*	*1.047*	*.762*	*.991*
22) Medical services	1.922	2.381	1.786	2.012
23) Hospitals	1.034	1.243	.617	.828
24) Education	1.085	1.016	.828	1.233
25) Welfare	2.183	1.016	1.469	.877
26) Nonprofit	1.119	1.699	.999	1.156
27) Postal services	.432	.329	.466	.494
28) Government	.403	.591	.510	.781
29) Misc. social serv.	1.329	2.605	.252	1.039
VI. PERSONAL SERVICES	*1.763*	*1.937*	*1.361*	*1.545*
30) Domestic services	2.552	2.804	1.552	1.567
31) Hotels	1.870	1.644	1.105	1.011
32) Eating & drinking	1.650	2.257	.995	1.501
33) Repair	1.467	1.237	.986	1.167
34) Laundry	1.110	2.107	.983	1.049
35) Barber & beauty shop	.998	1.356	1.317	.936
36) Entertainment	2.325	2.033	1.334	1.505
37) Misc. personal serv.	1.571	1.352	1.668	2.176
TOTAL LABOR FORCE	*1.308*	*1.202*	*1.318*	*1.042*

Table VIII- 9
(Continued)

VARIANCE OF EARNINGS BY INDUSTRY SECTOR, INTERMEDIATE
INDUSTRIES, ETHNIC STATUS, AND SEX, 1959-1969

Sectors and Industries	White Females		Black Females	
	1959	1969	1959	1969
I. EXTRACTIVE	4.457	4.088	2.199	2.545
1) Agriculture	3.996	4.343	2.180	2.514
2) Mining	1.970	.910	1.065	.844
II. TRANSFORMATIVE	.822	.791	.856	.754
3) Construction	2.812	2.225	1.519	1.148
4) Food	1.254	.840	1.065	.932
5) Textile	.523	n.a.	.638	.613
6) Metal	.698	n.a.	.689	.551
7) Machinery	.463	.602	.695	.674
8) Chemical	.372	.631	.956	1.138
9) Misc. manufacturing	.985	.898	.773	.771
10) Utilities	.303	.834	.592	.850
III. DISTRIBUTIVE SERVICES	2.064	1.543	1.583	1.304
11) Transportation	1.416	1.105	1.951	.946
12) Communication	n.a.	.794	.496	.817
13) Wholesale	n.a.	1.314	1.252	1.072
14) Retail	2.207	1.604	1.639	1.443
IV. PRODUCER SERVICES	1.262	1.885	1.108	.904
15) Banking	.641	.634	.910	.749
16) Insurance	.674	1.002	.545	.669
17) Real Estate	3.140	1.829	1.329	.970
18) Engineering	.582	1.568	1.229	1.106
19) Accounting	1.676	2.222	.235	1.691
20) Misc. business serv.	1.986	1.640	1.330	1.137
21) Legal services	1.348	1.389	1.380	1.009
V. SOCIAL SERVICES	1.576	1.179	.916	1.022
22) Medical services	1.415	1.282	.859	1.154
23) Hospitals	1.483	.774	.801	.766
24) Education	1.592	1.310	1.158	1.190
25) Welfare	2.480	1.340	1.048	1.182
26) Nonprofit	1.937	1.460	1.138	1.245
27) Postal services	.683	1.272	1.329	.700
28) Government	.993	1.028	.743	.894
29) Misc. social serv.	2.580	1.953	.420	.950
VI. PERSONAL SERVICES	2.092	1.972	1.137	.716
30) Domestic services	1.607	1.821	1.012	1.003
31) Hotels	2.449	2.085	1.074	1.189
32) Eating & drinking	1.927	1.802	1.345	1.492
33) Repair	4.341	3.238	1.502	2.138
34) Laundry	2.400	1.416	.950	1.113
35) Barber & beauty shop	1.526	1.484	1.544	1.477
36) Entertainment	2.032	1.892	1.079	1.542
37) Misc. personal serv.	1.649	1.838	2.064	2.575
TOTAL LABOR FORCE	1.883	1.423	1.512	1.278

n.a. =not available

in both 1959 and 1969, but there is a substantial range across the different industries. Although the variance of earnings for total white males, for example, decreased from 1.308 in 1959 to 1.202 in 1969, the sectors show differing patterns. The variance of earnings dropped slightly in the Transformative and Distributive services sectors, whereas it increased significantly in Producer and Personal services. As we pointed out earlier, the decrease in the variance of earnings for all white males resulted largely from the proportionate decrease of white male employment in the Extractive and Personal services sectors, where the variance of earnings is the highest. Black males experienced a similar pattern; there were large decreases in inequality in the Extractive and Transformative sectors, but the inequality rose in all of the other sectors. White females, on the other hand, experienced a large decrease in inequality from 1.883 to 1.423 which was accompanied by decreases in the variance in all six sectors with the sharpest drops in Social services, Distributive and Extractive sectors. The variance of black females decreased similarly, with the exceptions of the Extractive and Producer services.

Sectoral differences exist independently of the race-sex hierarchy. When the six sectors are rank-ordered in terms of the magnitude of variance, a clear pattern emerges (see Table VIII-10). The Extractive and Personal services sectors have the highest variance in every case, except for black females. Sectoral differences for the latter vary a great deal between 1959 and 1969. This may be the result of the dramatic decrease in the share of total black females in Personal services. Over one-half of all black females were employed in that sector in 1960, but this proportion was reduced to 27 percent in 1970.

The Transformative and Social services sectors have the least variance, with the exception of white females in 1960 and black females in 1970. The Distributive and Producer services sectors often trade positions, but they remain in the middle of the ranking.

The inequality in the Extractive sector is largely the effect of agriculture, which has a mix of very high and very low earnings (Table VIII-9). Mining, on the other hand, is fairly homogeneous. One obvious difference between these two industries is the predominance of unionized wage labor in mining and the combination of self-employment and non-unionized farm laborers in agriculture. Personal services has characteristics similar to agriculture in this respect -- the hotels, eating and drinking places, repair and laundry services, and barber and beauty shops have high percentages of self-employed workers, and little unionized wage labor. In addition, employment in these industries tends to be more transient than employment in the economy as a whole.

The Transformative sector clearly has the lowest variance. This is particularly significant for males, for they are heavily concentrated in this sector. It is also the most unionized industry sector and, of its industries, metal, machinery, and chemical industries have among the lowest variance of earnings of all industries. These three industries can be classified as modern industries, in contrast to the more traditional industries such as textiles and food. Again, the former group of industries is more unionized and uses less part-time employment than the remainder of the Transformative sector.

Differences within the Distributive, Producer, and Social services sectors are more difficult to evaluate. Transportation and communication have

Table VIII-10

INDUSTRY SECTORS RANK-ORDERED BY VARIANCE OF EARNINGS, 1959-1969

White Males

1959		1969	
EXTRACTIVE	2.635	EXTRACTIVE	2.522
PERSONAL SERVICES	1.763	PERSONAL SERVICES	1.937
DISTRIBUTIVE SERVICES	1.235	PRODUCER SERVICES	1.365
PRODUCER SERVICES	1.207	DISTRIBUTIVE SERVICES	1.211
SOCIAL SERVICES	1.017	SOCIAL SERVICES	1.041
TRANSFORMATIVE	.768	TRANSFORMATIVE	.750

White Females

1959		1969	
EXTRACTIVE	4.457	EXTRACTIVE	4.006
PERSONAL SERVICES	2.092	PERSONAL SERVICES	1.972
DISTRIBUTIVE SERVICES	2.064	DISTRIBUTIVE SERVICES	1.543
SOCIAL SERVICES	1.576	PRODUCER SERVICES	1.205
PRODUCER SERVICES	1.262	SOCIAL SERVICES	1.179
TRANSFORMATIVE	.822	TRANSFORMATIVE	.791

Black Males

1959		1969	
EXTRACTIVE	2.069	EXTRACTIVE	1.653
PERSONAL SERVICES	1.361	PERSONAL SERVICES	1.545
DISTRIBUTIVE SERVICES	.930	PRODUCER SERVICES	1.067
PRODUCER SERVICES	.900	DISTRIBUTIVE SERVICES	1.027
TRANSFORMATIVE	.812	SOCIAL SERVICES	.991
SOCIAL SERVICES	.762	TRANSFORMATIVE	.729

Black Females

1959		1969	
EXTRACTIVE	2.195	EXTRACTIVE	2.500
DISTRIBUTIVE SERVICES	1.583	DISTRIBUTIVE SERVICES	1.304
PERSONAL SERVICES	1.372	SOCIAL SERVICES	1.022
PRODUCER SERVICES	1.108	PRODUCER SERVICES	.994
SOCIAL SERVICES	.986	TRANSFORMATIVE	.758
TRANSFORMATIVE	.856	PERSONAL SERVICES	.716

low values for males, but not for females (unionization again doubtless plays a role for males); retail trade is higher in variance than any of the other Distributive services. Again, the proportion of employment working part-time seems to be related to this situation, for even in transportation a large share of female employment works part-time. It can be expected that the more the labor input of workers within an industry varies, the larger will be the variance in earnings in that industry.

Banking and insurance services have the least variance of any of the Producer services. In contrast, accounting, miscellaneous business, real estate, and legal services, all having a high proportion of self-employed (see Table VIII-4), show the highest variance. Earnings variance in Social services is more difficult to evaluate, for it differs widely among the race-sex groups. However, postal services and government are uniformly low while welfare and medical services are uniformly high in variance of earnings. Although unionization is not an important influence in Social services, the contrast between postal services and government, on the one hand, and medical services, on the other hand, suggests that bureaucratization of work has an effect similar to that of unionization in reducing the dispersion of earnings. This situation seems to be due to the fact that within bureaucracies there is more of a continuum from low to high status occupations and a greater bunching of earnings, whereas in medical services the occupational structure is characterized by a high concentration of employment in professional occupations. In 1970 64.5% of all males in medical services were professionals. As these professionals have earnings that are substantially higher than those of any other occupational group in medical services, we can expect the variance of earnings to be high as well. This line of reasoning is supported by the fact that the variance of earnings in medical services is much lower for women who also are much less concentrated in professional occupations. Moreover, the dispersion of earnings for males, white and black, in hospitals is far less than that in medical services (see Table VIII-9). In the case of black males in 1970, for example, the variance of earnings in hospitals was .828 as compared with 2.012 in medical services. Again, fewer males employed in hospitals are professionals compared to those in medical services. For white males in 1970, the difference was 44.6 percentage points, and it was 23.0 for black males. Since hospitals have a much higher degree of formal organization than even those medical offices in which physicians form a pool, these findings indeed suggest that bureaucratization and formal organization tend to reduce the variance of earnings.

There was a significant decrease in the variance of earnings during the 1960-1970 decade for all four race-sex groups, but this in itself is difficult to interpret except in the most general way. Overall, we can say there was an important decrease in inequality and this is a favorable trend, but on the level of particular industries this need not always be favorable for the individuals involved. Consider the example of black males in employment. The variance of earnings here rose from .510 to .781, but the greater resulting "inequality" may in truth mean that black males, who were formerly relegated to low-status jobs in which the earnings variance was low, had an opportunity during the decade to obtain more better-paying positions, thus increasing the inequality. The dispersion of earnings, therefore, must be interpreted with care. A low variance of earnings in a given industry signifies only that its workers had very similar earnings. But this could mean many different things: all workers could be in low-status occupations, or all could be professionals. An industry with a high variance of earnings almost certainly means the existence of low-paid and high-paid individuals. In that sense, the amount of variance of earnings in an industry can be interpreted as an indicator of the variety of different positions or the occupational mix that exists in this industry. This interpretation is quite similar to the meaning of the variance of earnings for the total labor force. As we noted in the introduction to this chapter, variance of earnings increases during the early stages of industrialization and decreases in the course of further economic development.

Since a change in the variance of earnings can be the reflection of many different situations, it is helpful to relate these changes to the actual frequency distributions of earnings. When an important criterion for comparison, such as race, is selected, the use of the variance or mean can be extremely misleading; many different odd-shaped distributions can give rise to the same average. For instance, the mean for any group can be raised substantially by introducing a small number of high-earning observations, but this says little about changes in the welfare of the overall group.

The frequency distributions for all four race-sex groups are given in Table VIII-11. Since the rise in both nominal and real income during the decade shifted the entire distribution upward for every group, we will interpret the data through the graphs in Figure VIII-1 and VIII-2 which reveal significant differences in the shapes of the curves between the race-sex groups in 1960 and 1970. The most visual difference in these graphs is that between the sexes. Females have relatively smooth curves that are steeply declining from low earnings to high earnings, with only a moderate second peak in the $2,000-5,000 categories for white females in 1959 and 1969 and black females in 1969. Figure VIII-2 thus shows that the decrease in the variance of earnings for females mainly resulted from the decrease of the peak in the lowest income category. For males, there is no one single peak that is as extreme as the lowest income category for females, although for black males the $0-999 category also is the largest. One of the most pronounced changes occurred for white males who show a high concentration in the $10,000-14,999 category for 1970.

What is striking about the distributions is the importance of the lowest income category which even for white males accounts for the second highest proportion. This group of very low income is disparate in composition and therefore somewhat difficult to interpret. It includes those who were new entrants and reentries to the labor force during some part of the year, as well as the "regular" part-time, part-year workers, since $1,000 and under is less than the poorest-paying occupation and is far below subsistence income for one year. While 23.6% of white males in 1959 were in this category, 27.1% of black males, 32.8% of white females, and 51.2% of black females earned less than $1,000 -- a striking contrast. In 1969, however, the differences were less acute: 15.2% of white males, 13.4% of black males, 20.8% of white females and 23.3% of black females were in the bottom group. The range is reduced from 27.6% in 1959 to 9.9% in 1969.

It appears from the graph that the $2,000 mark in 1959 and the $3,000 mark in 1969 are especially significant, since frequencies here are in a trough which is between the very low incomes on the one hand and the less-steep higher

Table VIII-11

PERCENTAGE DISTRIBUTION OF EARNINGS BY RACE AND SEX, 1959 - 1969

Income Category	White Males		Black Males		White Females		Black Females	
	1959	1969	1959	1969	1959	1969	1959	1969
$ 0-999	23.6	15.2	27.1	13.4	32.8	20.8	51.2	23.3
1000 -1999	5.3	4.6	13.8	6.5	15.2	11.4	21.0	14.1
2000 -2999	6.6	3.3	18.0	7.5	17.8	10.5	13.2	13.3
3000 -3999	9.9	3.9	15.7	10.8	16.7	13.3	8.5	14.6
4000 -4999	13.2	4.6	13.4	10.9	10.3	12.6	4.1	11.1
5000 -5999	14.4	6.4	7.8	11.2	4.3	10.6	1.3	8.7
6000 -6999	10.2	7.8	2.7	10.7	1.7	7.8	.5	5.8
7000 -7999	6.2	9.2	.9	9.7	.6	5.1	.2	3.7
8000 -8999	3.6	9.2	.4	7.2	.3	3.0	.0	2.2
9000 -9999	2.1	7.3	.2	4.5	.1	1.7	.0	1.3
10000-14999	3.5	20.0	.1	6.5	.2	2.8	.0	1.7
15000-19999	.8	5.1	.0	.8	.0	.3	.0	.2
20000-24999	.3	1.7	.0	.2	.0	.1	----	.0
25000 and more	.4	2.0	.0	.2	.0	.1	.0	.1
	100.1	100.3	100.1	100.1	100.0	100.1	100.0	100.1

Figure VIII-1

PERCENTAGE DISTRIBUTION OF EARNINGS FOR MALES, BY ETHNIC STATUS, 1959-1969

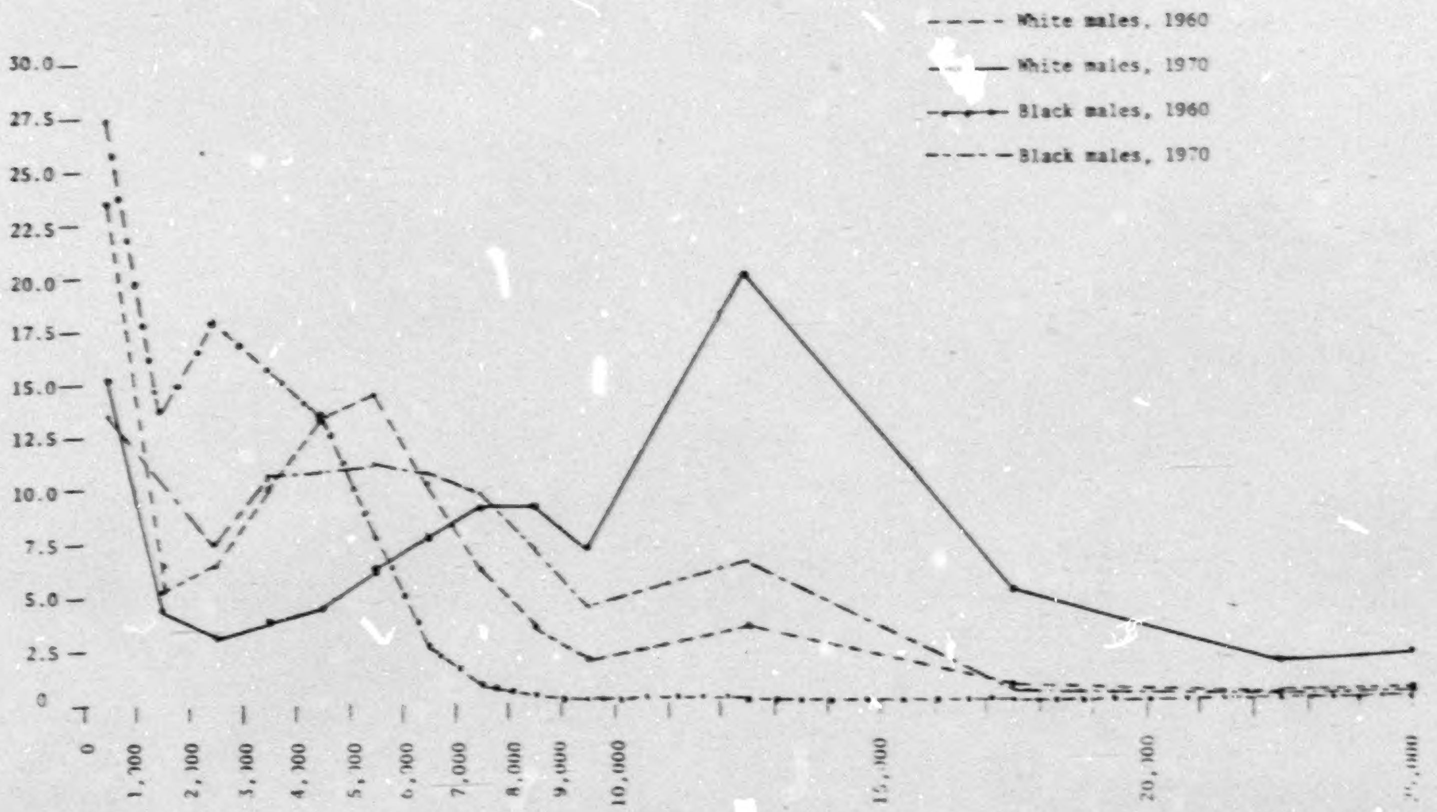
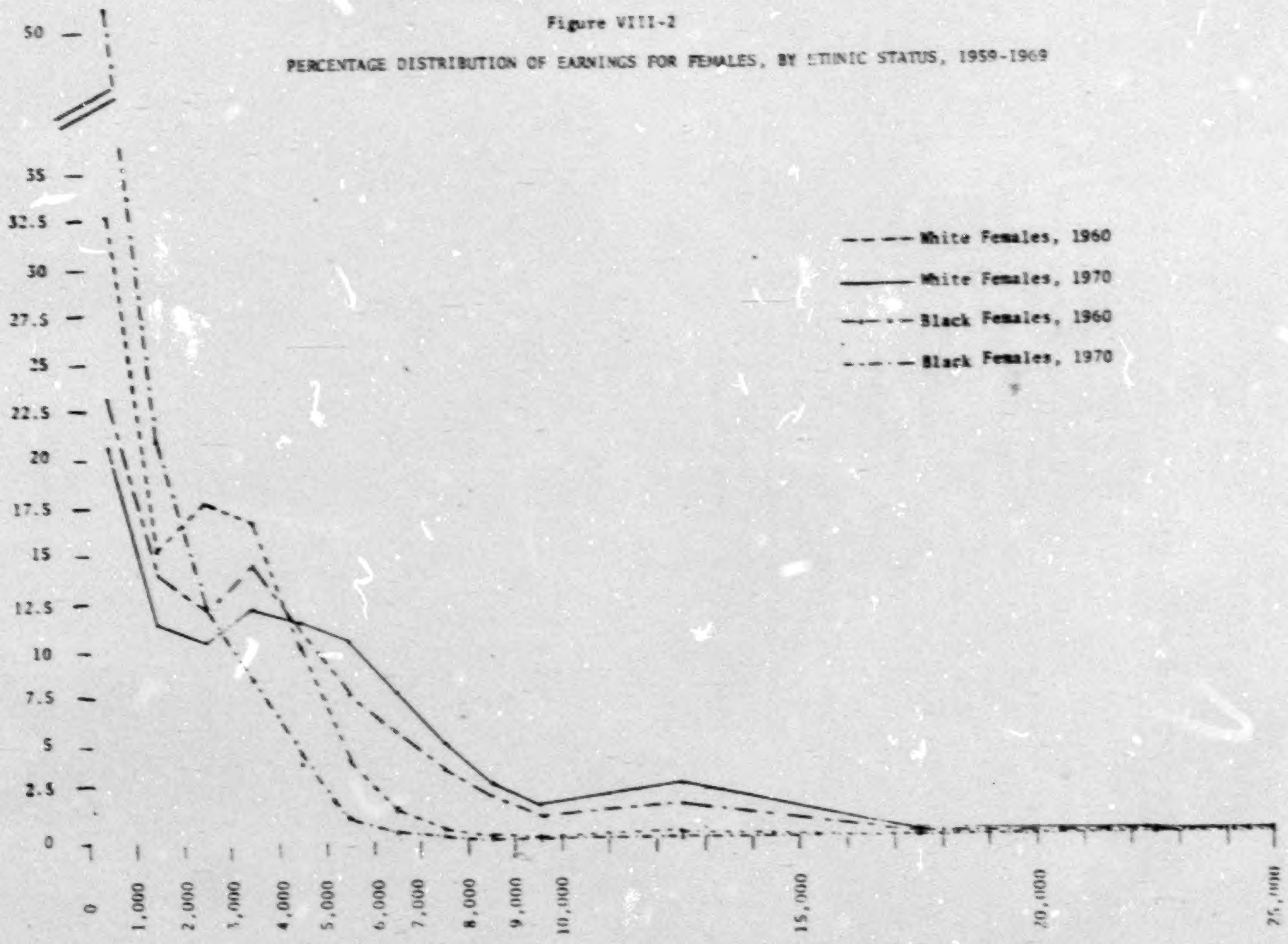


Figure VIII-2

PERCENTAGE DISTRIBUTION OF EARNINGS FOR FEMALES, BY ETHNIC STATUS, 1959-1969



incomes on the other. This strongly implies that the bimodality is in fact a result of unemployment. But unemployment affects the distribution of earnings in diffuse ways. Persons who are unemployed at one point in time find employment later on, and others become unemployed who had jobs before. Thus, rather than removing 5% from the labor force for an entire year, as many as 15% of a group such as black females may absorb the effects of a slow-down by suffering a reduction in earnings for part of the year.

Although some "unemployment" may be a voluntary absence from the labor force for a limited time, it is likely that changes within a race-sex group between 1960 and 1970, especially among males, are largely a reflection of differences between the two years in the demand for workers. While differences between men and women largely may be explained by desire of some females for more flexibility in work commitment, it is difficult to believe that this "taste" for part-time work among females would change so radically over ten years. This shift seems to be evidence of demand factors. Unemployment rates may not reflect these differences in demand for women, particularly since married females are less likely to collect unemployment insurance or register officially as unemployed. It is also important to note that high variability in weeks worked for blacks is not a result of demand for part-time work. Low incomes and sporadic employment are related in a circular fashion. There is little incentive to stay with a job that pays poorly, and there is little reason to pay a worker well if he is likely to be transient.

CONCLUSIONS

This chapter, it will be recalled, began with a consideration of the accuracy with which three approaches to the analysis of the earnings distribution predict changes in earnings dispersion in the U.S. between 1959 and 1969. It was found that the simple assumption that the variance in earnings within each sector was constant between 1959 and 1969 and the mean levels of earnings increased proportionally enabled us (simply by considering the effects of sectoral shifts in employment) to predict the change in earnings dispersion among white and black males tolerably well. On the other hand, assuming that the rewards to the education and experience of the labor force remain fixed in relative terms over the decade leads to poor predictions of the change in the earnings distributions of both white and nonwhite males.

Although the accuracy of this approach can be improved by considering changes in the residual variance to be endogenous, as we have done, ours is an ad hoc approach which requires much further theoretical and empirical work on the nature of the residual varaince in earnings functions before its appropriateness can be judged. That the empirical relationships we have estimated between the residual varaince and the human capital variables may not be stable is indicated by the fact that the predictive equation was more accurate for white males than for black males and did poorly when applied at the sectoral level.

We conclude, therefore, that the sectoral approach offers a useful view of how the earnings distribution in the U.S. has changed over time.

The influence of the sectoral transformation of the labor force on changes in the dispersion of earnings were demonstrated by our discussion of the differences in earnings dispersion among sectors and industries. The data showed that agriculture and Personal services have a high dispersion of earnings for all four race-sex groups. Since these industries employed proportionately fewer persons in 1970 than ten years earlier, a decrease in the overall dispersion of earnings was to be expected.

Although the human capital approach has the attractive feature of being derived from neoclassical principles, the parameters of the model do not seem sufficiently stable for the model to serve well as a predictive tool. This observation is somewhat puzzling because cross-sectional tests of the human capital model have generally been strongly supportive of the framework. When regressions are run across individuals in various industries or states it is usually concluded that constraining the parameter estimates to be identical across these units diminishes the explanatory power of the model only marginally. Findings of this type suggest that at a given moment in time the variations in the parameters of the model are of no practical importance and the assumption that they are constant may be a good one. On the other hand, the structure of the model does vary considerably over time.

It would be useful of course to understand and predict how the parameters of the human capital model are likely to change over time, but it seems fair to say that there is no macro theory of human capital and little is known about the determinants of the model's parameters. This is a major gap in the theory of human capital and an area where further research could be fruitfully applied.

Chapter IX

THE SECTORAL TRANSFORMATION AND THE NATURE OF WORK IN A SERVICE SOCIETY

The purpose of this study has been to focus attention on the ways by which the industry structure of the U.S. has been changing. In considerable detail we have examined various facets of the sectoral transformation, emphasizing the "how" of this change as well as the "who" in terms of the social characteristics of those occupying different industry positions. Other than Chapter VIII, where we addressed the problem of the relationship between industries and the dispersion of earnings, little attention has been directed to the consequences of the sectoral transformation.

In the last chapter we depart from our approach, which has relied heavily--some readers may say excessively--upon the presentation and analysis of large masses of data from the 1960 and 1970 censuses, to make a number of general, rather speculative, comments on some of the consequences, mainly sociological, of the sectoral transformation. We emphasize the movement into service work and its implications. One of the themes throughout this report has been that work in service industries differs from that in goods-producing industries, and we shall want to explore the significance of this statement from the standpoint of the following dimensions: the conditions of work, work satisfaction, alienation and the nature of social classes. We will, therefore, take up some of the points touched upon in Chapter I when we addressed the question of whether or not there would be a Service Revolution.

A general caveat should be introduced at this point. We took special pains in the Introduction to argue that the Fisher-Clark three-sector classification scheme was increasingly inadequate because the tertiary or service sector was too heterogeneous to be useful for analytical purposes. It was for this reason that we broke down the tertiary sector into the four service sectors that are used throughout this report. Yet in the prior paragraph we were contrasting the service industries with the goods-producing industries. Aren't we failing to follow our own advice?

The answer is that for certain purposes it is warranted to speak of services as an entity, especially in instances such as the above when we were making a basic contrast between services and goods-producing industries. For most purposes, however, it is preferable to refer to the four service sectors and even at times to specific service industries. It should be stressed, for example, that in the U.S. there has *not* been a shift of employment towards services *per se* in the last several decades--but very predominantly a shift to Social and Producer services. Personal services have decreased as a proportion of total employment while Distributive services have done little more than hold their own. One of the distinguishing features of the service society is the lack of servants; it is not so much individuals who serve, but rather firms and organizations. Increased per capita income and the concept of the welfare state in industrially advanced countries has enabled most, if by no means all, of the groups of society to have use of services (i.e., education and health) that formerly had been the privilege of only a few.

The industry changes over the last 100 years, as was sketched in Chapter II, have been impressive. In 1870 more than one-half of the labor force (52%) was in the Extractive sector; it had declined to a mere 4% in 1970. In a century of fantastic increases in the production of manufactured goods, the Transformative sector gained in its proportionate share from 23% to 33%. By contrast, Social services grew from just 3% to 22% in the 1870-1970 period (see Tables II-1 and II-2).

No one can say with any authority what the industry distribution will look like in 2070, or even in the year 2000. It is clear, however, that the Extractive sector no longer can play the decisive role it did in the 1870-1970 period, simply because it has dwindled to such a low figure that it cannot decline much more. Even should Social and Producer services continue to increase their relative share in the coming decades it is unlikely that the two together will exceed 40% of the total by 2000. In other words, we don't believe that any sector will have the relative weight as in 1870 and the consequent dynamism of the Extractive sector. Therefore, the greatest changes in sectoral distribution probably have been made. This does not mean that further changes will not take place nor, more importantly, does it imply that since the major part of the sectoral transformation appears to be behind us it loses its significance and importance. We would argue that many of the effects of this change are not yet clearly perceived, and in part this may be due to the delayed effect many sectoral changes have on social institutions. An example of this point is unionization. The fact that services are much less unionized than in the Transformative sector at the present time does not necessarily mean that this relationship will continue to hold. Perhaps 50 years from now there will be little difference between the two in degree of unionization.

Returning to the present situation, Victor Fuchs, to whom we have turned repeatedly in the course of this investigation because of his path-breaking book, *The Service Economy* (1968), raises a number of provocative and important points, mainly of an economic nature, in a last chapter entitled, "Some Implications of the Growth of a Service Economy." They merit brief review, because they merge into the more sociological considerations to be taken up later.

Fuchs believes that the move to a service economy has made increasingly unreliable a key economic statistic, the gross national product, because current measures of real output in most of the service industries have been unsatisfactory. Because of the inherent problems in measuring output and productivity in the services even though substantial improvements can be made, it is only realistic to anticipate "that these efforts are likely to leave considerable margins of uncertainty."

One feature of the problem of productivity in services has to do with changes in demand. It is difficult to determine the productivity of a number of services without knowing differences in peak and non-peak demand and the "size of transaction," meaning how much is transacted with one customer making one purchase. Productivity may be enhanced more by increasing the size of the transaction than by increasing the number of transactions.

Another economic consideration with demographic and sociological overtones has to do with the conceptions of labor and capital and the "embodiment" of technological change. Economic discussions of embodiment until recently have stressed physical capital, assuming that capital is a fixed factor and that labor is variable. This may apply in manufacturing but it is not satisfactory in describing the situation in services. Labor-embodied technological change takes place when successive new cohorts to the labor force bring with them the advances in knowledge and new procedures that make for that change. As Fuchs notes (1968:197), "The concept of labor embodiment is likely to be most relevant when formal schooling and job security are important, as in the professional and technical occupations. Three-fourths of all professional and technical workers are employed in the Service sector."

Finally, Fuchs introduces a factor affecting productivity in the services that generally is neglected in economic analysis: "the consumer as a factor in production." Many services depend upon the knowledge, experience, motivation and even the honesty of the consumer. Providing examples that range from the school room to the supermarket and laundromat, Fuchs shows that the consumer "actually works" and if he doesn't function properly then the service "product" is likely to be inferior. Such considerations are rarely to be found in goods-producing industries.

This last consideration of productivity in the services shows how closely an economic analysis can get to a sociological one, for in considering producer-consumer relations we enter the sociological realm of interpersonal relations and norms governing behavior. And it is here where Fuchs, in his interpretation, has a tendency to go astray. To counter the well-known arguments that "industrialization has alienated the worker from his work, that the individual has no contact with the final fruit of his labor, and that the transfer from a craft society to one of mass production has resulted in the loss of personal identification with work" (1968:189), Fuchs maintains that the coming of the service economy "may imply a reversal of these trends" for it makes possible the "personalization" of work; "...the direct confrontation between consumer and worker that occurs frequently in services creates the possibility of a more completely human and satisfactory work experience." Since everyone can summon plenty of personal examples of distinctly unsatisfactory relationships with workers in service industries, be it government "bureaucrats" or auto mechanics, the question is why all too often the "possibility" of satisfactory relations does not work out that way in practice.

SOCIOLOGICAL DIMENSIONS OF WORK IN SERVICE INDUSTRIES

Let us begin with a discussion of the conditions of work. Chapter V demonstrated that the growth of services has been accompanied by an expansion of employment in professional, semi-professional, clerical, and service occupations. At the same time, changes in the industry structure have not favored the growth of manual occupations, which have been experiencing decreases in their share of total employment. The former set of occupations have in common that they usually do not require physical strength, although there are exceptions, such as some work in hospitals. Three of these four expanding occupations are white collar and do not involve working conditions as hazardous as often exist in mining or steel production. In this sense, the growth of services and their related expansion of white collar and service occupations can be interpreted as an improvement in the physical conditions of work.

It also was mentioned earlier that work in many service industries is more flexible than in goods-producing industries. This flexibility is due to a number of reasons. Fuchs (1968) called attention to the fact that the size of establishments is much smaller in services than in manufacturing. Small firms usually require less formal organization of work than large establishments and therefore permit more flexibility. But there is another, more important, difference between services and goods-producing industries; namely, the extent to which work is segmentalized. Work in many manufacturing industries is carried out on an assembly line basis with each person performing only a segment of the total process of production. Since this type of production depends on each worker doing his task, the absence of a few workers can disrupt the entire production process. For that reason, the technology requires a continuous and reliable input of labor. Even in manufacturing industries and establishments that do not employ assembly-line techniques of production, tasks usually are very standardized and therefore can be scheduled quite rigidly.

This rigid scheduling of work cannot be done in most services, since much of service work involves close contacts with the consumer whose needs and preferences need to be taken into consideration. Services rarely can be stored so it is difficult to establish long-term production schedules that smooth out variations in demand. Production in services, therefore, is less segmentalized and a person's work depends less on the work of others. In that sense work in services is more self-contained than in Transformative industries. This situation would suggest that workers in services can identify more with their work as compared with other industries.

But it is quite obvious that this identification with work does not exist in all services. Clerks in retail trade and service personnel in eating and drinking places are good examples of these exceptions. What needs to be taken into consideration, however, is the fact that a large part of this work is part-time employment. The bulk of workers in these positions are young and consider their jobs as only temporary as, for instance, those making plans to finish school. Not much identification with work may be expected or is needed in these cases. It is important to note, however, that services, due to their greater flexibility of work scheduling, at least offer opportunities to those who voluntarily seek part-time employment. (As we stressed before, this interpretation does not imply that we consider all part-time employment to be voluntary.)

In general, it can be expected that many service establishments will attempt to introduce more capital in order to increase productivity. Many short-order food places, for example, increasingly resemble assembly lines. Inevitably this will mean that services will become more formally organized and their work more rigidly scheduled. This situation already exists in a number of services such as communication, banking, and insurance. But in the case of insurance, while the rationalization and bureaucratization of work goes on in the giant home offices, there are thousands of self-employed insurance agents who head, at most, a small office. Even though this trend towards rationalization will make work in services more similar to that in goods-producing industries, there are limits to that convergence. Many services such as education and health for a number of reasons cannot become as capital intensive as goods-producing industries.

What does all this mean for the individual worker? In a study of industrial work and workers' consciousness, Kern and Schumann (1970) found that autonomy of work was an important determinant of work satisfaction. Autonomy in this case referred to the degree to which workers were able to schedule their own work. Among the various groups, maintenance workers expressed the highest degree of work satisfaction. The main task of these workers was to repair machinery that had broken down. Despite the time pressure under which they worked, for the continuation of production depended on their promptly repairing the machines, the maintenance workers considered themselves to be experts who were able to determine how much time their work took and could therefore best organize their work schedules.

In many instances, work in services has the same qualities. Consider the example of a social worker, for whom the time spent on a particular case largely depends on the problems involved. Similarly, legal services require a certain amount of research for which the labor input not always can be precisely predicted. And even in the case of postal services, mail-delivering persons are able to schedule the pace of their work within given limitations. These examples do not imply that there are no time constraints on the work. To be sure, social workers have a certain case load, as do lawyers, and the mail has to be delivered to a certain number of households. But all three cases have in common, although the first two more than the last, that the workers are in a position to make their own decisions about how to divide their time among the clients. It therefore could be hypothesized that persons employed in services have greater work satisfaction than those in Transformative industries.

The case of Social services, in particular, is interesting for an examination of work satisfaction. These services increase with economic progress and make up, according to Mandel (1970:206), the creative part of the labor force. Their growth

> ...means that a larger and larger section of mankind are freed from the obligation of carrying on uncreative work. Here we have not a survival from a dreary past but the harbinger of a wonderful future. When automatic machines will do all the work needed to produce goods

> for current use, men will all become engineers, scholars, artists, athletes, teachers, or doctors. In this sense, but in this sense only, the future is indeed with the "tertiary sector."

One need not share Mandel's optimistic vision of the future to grant that Social services are distinguished from all other industries in that their main goal is the enhancement of the quality of life of the population. Persons employed in these services therefore can think of themselves as helping other individuals, a feeling that can compensate for other possibly dissatisfying aspects of their work. Moreover, Social services, by and large, are nonprofit, although their professional and administrative personnel receive substantial salaries.

Doing creative work, on the other hand, does not necessarily provide for job satisfaction. There is also the possibility that persons in Social service are not really interested in serving the public, for as Fuchs (1968:188) reminds us: "Teachers can ignore their pupils; doctors can think more of their bank balances than of their patients." To assume that the interests of workers in these services are totally congruent with the interests of their clients would indeed be naive. But despite these possible conflicts between the purveyor of a service and its consumer, Social services at least offer a potential for work satisfaction that most other industries do not have.

Work satisfaction is closely related to the concept of alienation, as far as its social-psychological interpretation is concerned. Alienation of work recently has received a great deal of attention. In general, it has been understood as the workers' inability to identify with their work and to derive satisfaction from their economic activities. This subject has been a recurring theme in the sociological literature, as witnessed by the studies of Blauner (1964) and Seeman (1959; 1972). The major dimensions of alienation, as defined in these studies, are (1) powerlessness, (2) meaninglessness, (3) isolation, (4) normlessness, and (5) self-estrangement. Applying these dimensions to the employment situation in services, we would expect to find a lower degree of alienation in services than in goods-producing industries. But of course, one also should expect important differences among services themselves. More persons employed in communication, banking, retail trade, or eating and drinking places are likely to feel more alienated than those in other services such as education, health, government, or advertising. While here we can only speculate about the degree of alienation, the discussion does suggest that the unit of industry is a useful analytical category, especially when combined with occupation, to examine differences in work satisfaction and alienation among workers.

In contrast to the social-psychological approach to alienation that we find in the sociological literature, alienation in its original conception was a structural concept. This distinction is important for it closely relates to the concept of social class. As will be seen later on, both concepts merit re-examination with the advent of a service-dominated labor force.

Although the concept of alienation was first developed by Hegel, it is Marx' use of the term that has most influenced sociological thinking. For Marx, alienation becomes manifest in two relationships that are closely connected: man and his labor, and man and his products.

In his Economic and Philosophic Manuscripts of 1844 Marx (1963) differentiates between unalienated and alienated labor. Unalienated labor is Marx' term for man's productive activity that is creative and which enables him to "appropriate" nature. It is through this form of labor that man develops his dominant position in the environment. In this sense, unalienated labor is the basis for man's fulfillment of his personality. Alienated labor, in contrast, prevents man from developing his full potential. The prototype of this labor for Marx would be work on an assembly line. The repetitive tasks and the narrow application of skills that man encounters in this work situation do not permit him to become master over his environment.

The second major form of alienation is the separation of man from his product. In part, this alienation results from the character of alienated labor itself but in addition, the product does not belong to the worker any more. "It is no longer the laborer that employs the means of production but the means of production that employ the laborer" (Marx, 1958:310). In that sense, the worker not only loses control over his work and his product, but also over the conditions of his work.

Both manifestations of alienation are seen by Marx as the necessary consequence of the capitalist form of production. Essential to this type of production, although not restricted to it, is the division of labor, without which capitalism could not function. It is mainly the division of labor that Marx sees as the obstacle to the full development of man's creativity. But Marx is not very precise in spelling out what exactly he means by the division of labor. Is it the division of labor into different occupations such as farmers, miners, welders, bus drivers, or nurses that creates alienation, or does this concept refer to the segmentalization of the production of a particular commodity into many different and limited tasks? Marx related both meanings of the division of labor to the occurrence of alienation, but it is primarily the segmentalization and specialization of work that he sees as the main evil of industrial capitalist society. Not only does the division of labor form the basis of alienation, together with the alienation of labor and the separation of man from his product it also leads to the emergence of the two classes in industrial society, one which controls the means of production and the other which is employed by these means

At this point, we should note that Marx largely was preoccupied with the conditions of work in manufacturing. As Kline (1967:427) nicely puts it: "Marx's paradigm of economic activity is the bringing into being of shoes and ships and sealing wax, not the polishing of shoes, the piloting of ships, or the packaging of sealing-wax." The main reason for Marx' interest in the goods-producing industries is his evaluation of "making" as a socially superior activity to only "doing" or "knowing". Only that work is productive activity which is objectified, i.e., which leaves a permanent mark. "For Marx, a poet who kept his poem to himself, like a painter who destroyed his painting as soon as it was completed, would not count as a producer." (Kline, 1967:428).

This brief summary of Marx' concepts of alienation, the division of labor, and social classes raises many important questions. For example, can a socialist economy abandon the division of labor? The question that is important for the present discussion, however, is, "Has the shift of employment towards services changed the conditions of alienation and the formation of social classes?" Since both concepts are key elements in sociological analysis, they merit a re-examination in light of the past employment changes.

We noted earlier that one of the characteristics of services is the absence of a tangible product. In that sense, work in some services can be considered to be even more alienating, for labor and product become one. An example of this are sales workers. Their work is labor and product at the same time. It is labor in that it can be exchanged for wages, and it is a "product" for the customer in the sense of assisting him in his needs. On the other hand, however, large parts of service work are less conducive to precise scheduling. Much of the work in services, moreover, cannot easily be divided into segments. To that extent, services should be expected to have a lower division of labor and their work therefore should be less alienated.

This alone, however, does not permit the conclusion that society is no longer divided into social classes, for the separation of man from his means of production still exists. But one particular feature of services needs attention: its largest sector, Social services, largely belongs to the public sector. Therefore, the relationship between capital and labor is different in this sector than in privately owned industries. Although many employees in hospitals or universities, for example, still have not much autonomy over their work and its conditions, this situation no longer is the exclusive result of the domination of capital (which in any event is not privately owned), but it increasingly stems from the different interests of the employment groups within a certain institution and the board governing it. In that sense, the organization of these employment groups becomes rather crucial for improvements in their positions within the various establishments. It is mainly this development that makes the concept of social classes no longer as useful as it once was. As Touraine (1971:81) puts it:

> Productivity, efficiency, the rationality of educational policies, land management, the organization of communications and authority in large organizations--it is more useful to analyze these elements of economic progress than the 'traditional production factors' capital, labor, and land. No longer is it the concentration of available surpluses but the rational organization of human and technical equipment that governs economic development. Under these conditions, the idea of two basic classes that constitute separate milieux, one reduced to subsistence, the other to managing surpluses, loses its importance.

The rejection of the class concept as a practical tool for sociological analysis cannot mean, however, that post-industrialism is the advent of the classless society. We are very far from that! What it does imply, however, is the need to identify prestige, power and social conflicts in terms of interest groups as they result from a common work situation, coalitions, and alliances; similar to the approach taken by Dahrendorf (1959). Empirically oriented sociology, in any event, has never convincingly demonstrated how the more or less arbitrary divisions of occupation, income, or socioeconomic status are related to the theoretical notion of social class as linked to the process of production. It is here where we can most profit from the use of the concept of industry, for interest groups are identifiable through the concepts of occupation and industry combined (although other criteria may be introduced). This new analytical tool could contribute substantially to the connection of our theoretical concepts with their empirical measurement in mobility studies, which ultimately should lead to a better comprehension of the changing character of the service society.

The importance of interest groups can be illustrated with the example of professionals. While in the past, professionals have considered themselves to be outside the traditional form of labor conflict between employers and employees, recent strikes by teachers and nurses represent a change in that attitude. It thus can be expected that professionals in the future increasingly will form collective bargaining organizations, be they formal unions or special professional associations. In that sense, the low degree of unionization to which Fuchs (1968:185) referred, is not likely to hold in the future.

While professionals, by the very nature of their expertise, are in a position to bargain for particular benefits, this bargaining power can even be achieved by work groups with much less status. This is due to the tendency, particularly in Social services, to spread responsibility for the proper delivery of services more widely. Let us again consider the example of health services. Although in hospitals, physicians and nurses carry the primary responsibility, the functioning of a hospital organization depends to a large extent on nurses' aides and non-medical personnel. No hospital can function over an extended time period without the cooperation of these employment groups. In this context, Marx' distinction between class *in itself* and class *for itself* is essential, for an interest group defined by structural characteristics, such as occupation and industry, becomes an "interest group *for itself*," i.e., a political force, only when it comprehends its position within the network of an organization or society. This situation has been linked by Touraine (1971:7) to the concept of alienation:

> The traditional forms of social domination have been profoundly transformed (in postindustrial society)...We continue to speak of "economic exploitation" but this process is more and more difficult to isolate. The term loses its objective meaning when forced to define our consciousness of social contradictions better expressed as "alienation," that much criticized notion which is, nevertheless, more useful than ever.

As long as employment groups are not aware of the alienated character of their work position (even though it might differ from one position to another), their "dependent participation" will continue to avoid social conflicts. Once they reach a consciousness of their employment situation, they are in a position to overcome the social contradictions by collective means.

This discussion has demonstrated that alienation in the structural sense has a meaning completely reversed from the one referred to in the social-psychological approach of Seeman (1959) and others. While the social-psychological approach views the alienation of a worker as a subjective expression of work satisfaction in its various components, the structural meaning of alienation refers to objective conditions of work situations. In the latter sense, the worker's consciousness of his alienation is to be interpreted positively, for it is a necessary condition for the elimination of alienation.

Our discussion demonstrates further, however, that much more information is needed about the nature of work in services. On the one hand, much work in Social services is creative and thereby unalienated. Other services, on the other hand, are alienated similar to that in goods-producing industries, yet the worker may find greater work satisfaction in services which would make an awareness of alienation much less likely. It is an examination of these four concepts --conditions of work, work satisfaction, alienation and dependent participation-- which offers the most promise for a sociological study of the implications of a service society.

SOME POLICY IMPLICATIONS OF THE SECTORAL TRANSFORMATION

Throughout this report a constant theme has been the utility and fruitfulness of looking at work from the vantage point of industry position. Our readers should now be prepared to decide for themselves whether they concur in this orientation. But aside from the evaluation of the success of this endeavor in providing for a better understanding of how the transformation of the labor force actually takes place, there is the related but independent question of what this implies for manpower policies. In terms of this policy, what sorts of strategies can be suggested that emerge from this report?

Banal as it appears to be, our first recommendation is for more research on the nature of services. Since few new analyses about services have appeared since Fuchs' study his statement still stands (1968: 13):

> Perhaps the most urgent need of all is for more and better-quality data concerning the service industries. Although the United States is now a service economy, the statistical reporting system largely reflects the interests and conditions of an economy dominated by agriculture and industry. We need more analysis, but we also need the factual basis that will make the analysis more fruitful. One unmistakable finding of this study is that there are significant gaps in our statistical information concerning service output, employment, prices, wages, investment, and profits. These gaps must be filled if

we are fully to understand this sector or, indeed, if we are to understand the economy of which it is the major part.

A good example of the inadequacy of statistical information about services is the U.S. Census of Commerce which reports statistics for only selected services. And even for these, the amount of information is a good deal less than can be found in the U.S. Census of Manufacturing. Thus, while we fully concur with Fuchs that employment, output, and productivity must be seen in their interrelationships to fully understand services, we will devote the following section to some implications for manpower policy as they derive from a study of employment.

One important area that needs more attention than it has received is the work life cycle. Only within this framework can we evaluate the meaning of work for individuals. Such an endeavor, of course, cannot be adequately undertaken with census data, for it requires complete work histories of individuals. But some of the findings in this report nevertheless have interesting implications. Consider the case of eating and drinking places. It was found in Chapter III that this industry has one of the lowest yearly hours per capita (it ranks 34th of 37 industries). In other words, a substantial part of employment in this industry is part time and intermittent. Other industries such as domestic service or barber and beauty shops can be similarly characterized.

Before concluding that here is a situation requiring policies that would promote stable employment and the reduction of part-time employment, we have to look more closely at who is occupying these positions. A significant proportion of total employment is made up of teenagers and college-age students who take this work on a part-time basis while they finish their schooling. Another segment is made up of women who are supplementing the family income by working on a part-time basis. Neither of these groups want full-time employment, and from the standpoint of their employers this arrangement also is best, given the great variation in demand (daily and often seasonally) for labor.

Moreover, these industries give many persons their first work experience which often is useful in securing later employment. In that sense, the peripherality of work in many industries can be, as Morse (1969) reminds us, beneficial both to the employer and the employee.

This discussion of part-time employment in terms of specific labor force groups and sets of industries leads to a more general distinction that we believe to be essential for manpower policy. This concerns the relationship between structure and population. More specifically, we need to know the requirements of the economy for labor and the characteristics and qualifications of persons of working age. After all, the general goal of any employment policy is to facilitate the match between the demand for labor and the supply of labor.

In this context we think that the interrelation of the industry structure and the occupational structure is of particular relevance. It is undeniable that manpower policies in the United States preponderantly have been very much oriented towards the occupational sphere, particularly those manpower programs designed to train individuals for occupational positions. As has been pointed out, some of these programs have been busily engaged in preparing individuals for jobs that did not exist. Perhaps if more attention had been given to the dynamics of the industry formation this miscalculation of the demand for labor would not have happened. Our position is that a careful analysis of sectoral and industry changes in recent decades is useful as a guide for the future.

The emphasis on the occupational dimension of work is not all that surprising, since both sociology and economics have given much attention to the characteristics of individuals and employment. It is in this tradition that Blau and Duncan (1967) studied social mobility and status attainment, and the human capital approach takes a similar perspective. But as was demonstrated in Chapter VIII, there are several limitations to the human capital approach when it is applied in the context of structural changes such as the sectoral transformation of the labor force. Undoubtedly, the characteristics of individuals, their family background, education, etc. and the influence of these variables on the employment history of these persons is valuable and necessary, but it has tended to overshadow the little work that has been done on the structural aspects.

One of the most important questions in terms of the structure of employment is the variability in the occupational "mix" within industries, i.e., the variety of positions. Some of these positions, for example, may involve very flexible work which more easily could accommodate part-time and intermittent employment than would be the case with other positions. Similarly, the educational requirements also can be expected to vary substantially.

The interconnection of industry and occupation is important in several other ways. We demonstrated in Chapter V that occupational changes result from two sources: changes in the industry structure and changes in the occupational distribution within industries. This distinction is very fruitful for it shows how much of the overall change in the occupational structure is the result of a different use of individuals within industries. This again relates to the flexibility of employment within given industries that was discussed above.

The other major implication of this procedure concerns the work situation of women and minorities. As noted before, the sectoral transformation of the labor force has been crucial for the employment of women, since over 75 percent of all employed women are to be found in services. Similarly, blacks experienced very substantial changes in their allocation to industries between 1960 and 1970; the proportion of black males decreased in the Extractive and Personal services sectors and black females showed a proportionate decrease in Personal services that was truly impressive. Since the Extractive and Personal services sectors are characterized by a large proportion of low-status occupations, the shift of blacks to other sectors has improved their employment situation in substantial ways. Even when these industry shifts do not result in a change in occupation this "horizontal" or situs mobility can result in an improved occupational standing for the individual. Consider the extreme case of domestic maids who become janitresses in a hospital. Although their task in both employment situations is cleaning up after other people, the context of this work is quite different. In domestic service, the work relationships are largely paternalistic, whereas in the hospital they are more formally organized. One advantage of work in larger organization is its greater likelihood to be covered by labor legislation such as minimum wage laws.

We conclude, therefore, that the sectoral transformation of the labor force generally has helped to better the employment situation of blacks (and Mexican Americans, as was shown for the Southwest). Moreover, the sectoral transformation also narrowed the gap between blacks and whites in terms of occupational standing and earnings, although this increased similarity was more pronounced for females than for males.

We must add to this, however, that the narrowing of that gap was somewhat less than expected. It can be seen from the 1970 data that women and minorities still were concentrated in low-status occupations compared to white males. This discussion has important implications for policies concerning the employment of women and minorities. Since the sectoral transformation of the labor force did not bring the work status of these employment groups up to that of white males, we should not have expected industry changes to be a substantial source for future improvements, the major part of the sectoral transformation of the labor force probably has already taken place. This leaves the possibility that changes in the occupational distribution within industries will result in improvements for women and minorities. But as we demonstrated in Chapter V, for instance, women were less likely to be employed as professionals in 1970 than ten years earlier. Thus, there are some doubts that changes in technology and organization of work within industries will lead to significant improvements of these employment groups in relation to white males. These findings suggest that changes in the industry structure and in the occupational distribution within industries do not automatically give women and minorities the work status of white males. This view implies that a great deal of the equality between employment groups will have to come at the expense of white males. In other words, increasing proportions of higher-status positions will have to be staffed by women and minorities and white males therefore are likely to increase their share in the lower-status occupations. Only if we assume that the number of high-status positions within industries can be increased at will, could greater equality of employment be achieved without affecting the position of white males. This, again, emphasizes how much more information we need about the flexibility of work in given industries.

Policies aimed at achieving greater equality of employment of course must take into consideration that the work life cycle of different employment groups could vary. But the past ten years have brought about so many changes in sex-roles, for example, that it no longer can be taken for granted that the employment of women is inherently less stable than that of men. In fact, there already is some evidence that when occupational status is controlled for, those industries with a high proportion of female employment have lower quit rates than industries in which there are only a few women employed. Thus, close governmental monitoring of hiring practices and assistance of the government to firms and institutions will be an important source for the achievement of greater equality among the various race-sex groups in the labor force.

Appendix A

DISCUSSION OF THE 1/100 PUBLIC USE SAMPLE TAPES

The data used in this study were taken from the 1960 and 1970 1/100 Public Use Sample tapes made available by the U.S. Bureau of the Census. The format of these data represents a great change from the way in which census data traditionally have been made available. All information on the tapes is arranged by persons; for each person, his or her age, sex, ethnic status, industry, education, occupation, etc. is given. This format permits detailed cross-classification of persons by more than 40 social, economic, and demographic characteristics. This type of information permits the investigator to treat census data in the same manner as he would a secondary analysis of sample surveys. That is, he can manipulate all the variables included in the census as he sees fit. This potential is particularly useful for the present study, for many of the variables selected there are no cross-classifications published in the census reports. The sample used for this study is based on questions from the 15 percent sample.

How then do the data reported in this study compare with the published census reports? For this research we considered all employed persons who were either "at work" or "with a job but not at work" due to illness or vacation (see Character P31, "Employment Status Record," Codes 1 and 2, in the Description and Technical Documentation of the Public Use Samples, U.S. Bureau of the Census, 1971 and 1972). The present sample thus consists of all *employed*, and therefore must also be compared with the published information for the employed. This concept is narrower than that of the *experienced labor force*, for it excludes the unemployed and members of the armed forces.

The only adjustment that was made with the employed concerned those persons with work status not reported who in 1970 were allocated to the industry groups. These individuals had to be excluded from the present sample and therefore must be subtracted from the published figures. The following listing shows the size of the sample (multiplied by 100) and the number of the employed in 1960 and 1970 as given in the Subject Reports of the 1960 and 1970 censuses, *Industrial Characteristics*, Tables 2 and 32, respectively (U.S. Bureau of the Census, 1967 and 1973).

	1960	1970
Published data	64,646,563	76,805,171
-persons that were allocated	----------	-4,874,838
Subtotal	64,646,563	71,930,333
1/100 sample (x 100)	64,384,100	71,928,700
Difference	- 262,263	- 1,633
Difference as percent of 1/100 sample	-.00407	-.00002

Although it can be seen that the difference between the sample and the published data was much larger in 1960 than in 1970, the 1960 difference is negligible as a proportion of the total sample. We therefore conclude that the site of our sample is comparable with the information from published census sources.

Appendix B

ALLOCATION OF INDUSTRIES

The following listings show how the industries as reported in the 1960 and 1970 Public Use Samples were aggregated to yield the 37 industries used in this study. The numbers refer, respectively, to those given in the 1960 and 1970 Description and Technical Documentation of the samples (U.S. Bureau of the Census, 1971; 1972) that were used in making up the work tapes.

1960 Allocation

1. Agriculture: 016, 027-028
2. Mining: 047-049, 057
3. Construction: 066
4. Food: 268-269, 278-279, 287-289, 297-299
5. Textile: 307-309, 317-319, 327
6. Metal: 139, 147, 149, 157-158, 166, 169
7. Machinery: 176, 178, 186, 206, 219, 227-228, 236
8. Chemical: 346, 349, 357, 359, 377-378
9. Miscellaneous Manufacturing: 107-109, 118-119, 127-128, 137-138, 246, 248-249, 259, 328-329, 337-339, 379, 387-389, 397-398
10. Utilities: 467-469, 477-479
11. Transportation: 407-409, 417-419, 427-429
12. Communication: 447-449
13. Wholesale: 507-509, 527-528, 536, 539, 558, 566, 588
14. Retail: 607-608, 617, 626, 629, 636, 646, 648, 657-658, 667-668, 677-678, 687-689, 696, 698
15. Banking: 706, 709
16. Insurance: 717
17. Real Estate: 718
18. Engineering: 888
19. Accounting: 889
20. Miscellaneous Business Service: 727, 736
21. Legal Services: 849
22. Medical: 826
23. Hospitals: 838
24. Education: 856
25. Welfare: 876
26. Nonprofit: 887
27. Postal Services: 907
28. Government: 917, 927, 937
29. Miscellaneous Professional Service: 897
30. Domestic Services: 769
31. Hotels: 776
32. Eating and Drinking: 669
33. Repair Services: 756, 766
34. Laundry: 779
35. Barber and Beauty Shop: 786

Continued

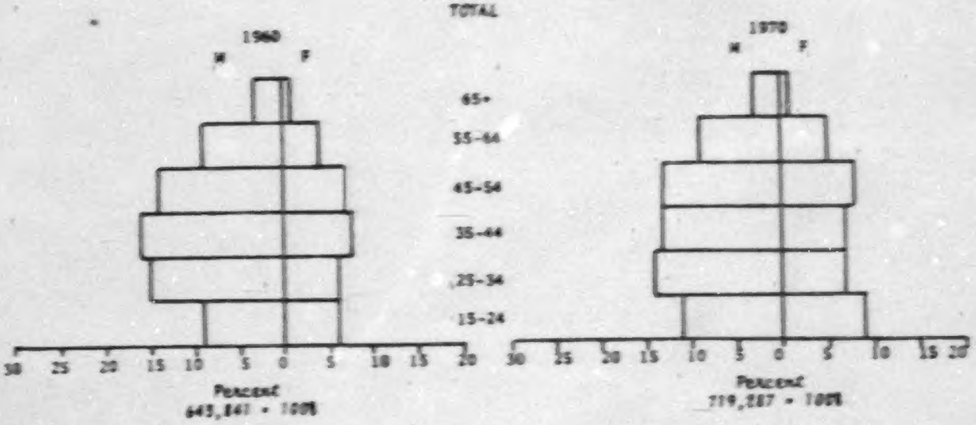
Appendix B, continued

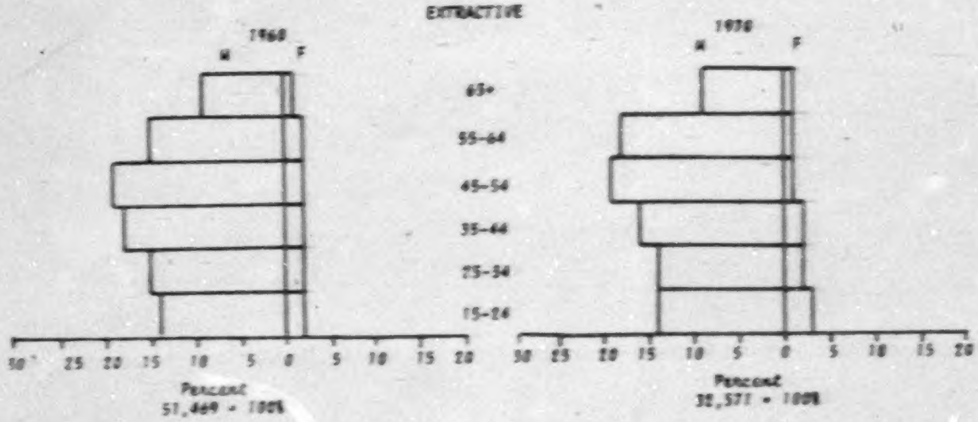
36. Entertainment: 807-809
37. Miscellaneous Personal Services: 789, 797-798

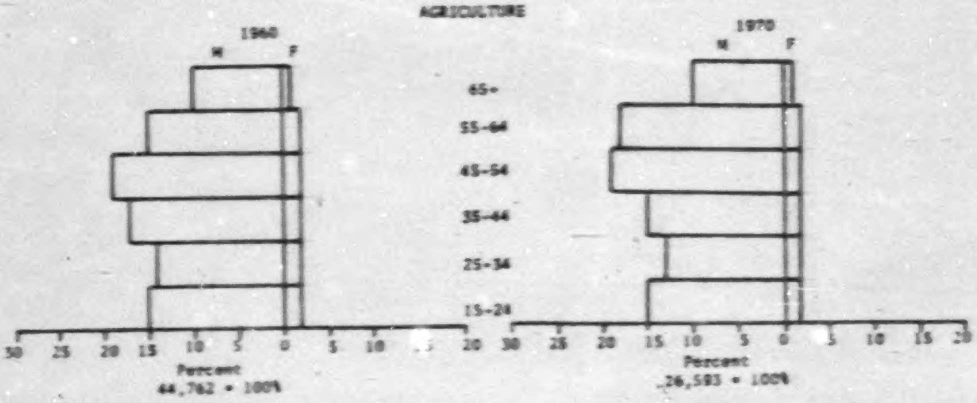
1970 Allocation

1. Agriculture: 17-19, 27-29
2. Mining: 47-49, 57-58
3. Construction: 67-69, 77-78
4. Food: 268-269, 278-279, 287-289, 297-299
5. Textiles: 307-309, 317-319, 327
6. Metal: 139, 147-149, 157-159, 167-169
7. Machinery: 177-179, 187-189, 197-199, 207-209, 219, 227-229, 237-238
8. Chemical: 347-349, 357-359, 367-369, 377-378
9. Miscellaneous Manufacturing: 107-109, 118-119, 127-128, 137-138, 239, 247-249, 257-259, 328-329, 337-339, 379, 387-389, 397-398
10. Utilities: 467-469, 477-479
11. Transportation: 407-409, 417-419, 427-429
12. Communication: 447-449
13. Wholesale: 507-509, 527-529, 537-539, 557-559, 567-569, 587-588
14. Retail: 607-609, 617-619, 627-629, 637-639, 647-649, 657-658, 667-668, 677-679, 687-689, 697-698
15. Banking: 707-709
16. Insurance: 717
17. Real Estate: 718
18. Engineering: 888
19. Accounting: 889
20. Miscellaneous Business Service: 727-729, 737-739, 747-748
21. Legal Services: 849
22. Medical Services: 828-829, 837, 839, 847-848
23. Hospitals: 838
24. Education: 857-859, 867-869
25. Welfare: 877-879
26. Nonprofit: 887
27. Postal Services: 907
28. Government: 917, 927, 937
29. Miscellaneous Social Services: 897
30. Domestic Services: 769
31. Hotels: 777-778
32. Eating and Drinking: 669
33. Repair Services: 749, 757-759
34. Laundry: 779
35. Barber and Beauty Shop: 787-788
36. Entertainment: 807-809
37. Miscellaneous Personal Services: 789, 797-798

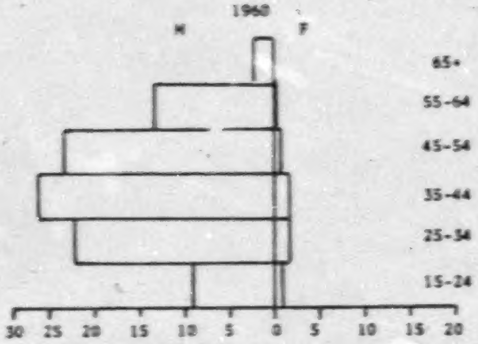
Appendix C
AGE-SEX PYRAMIDS OF SECTORS AND INDUSTRIES, 1960 AND 1970



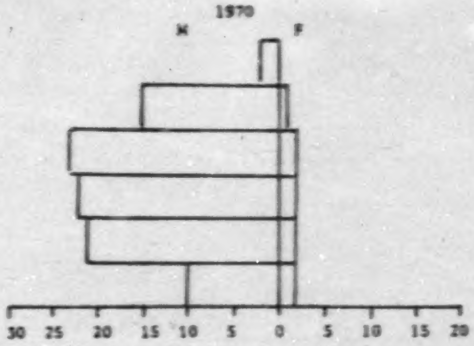




MINING

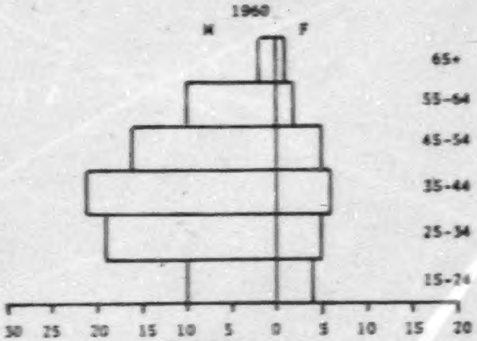


Percent
6,707 = 100%

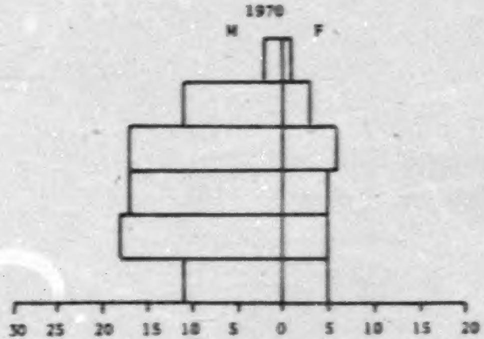


Percent
5,978 = 100%

TRANSFORMATIVE

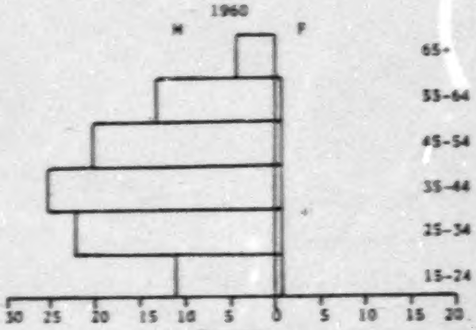


Percent
228,407 = 100%

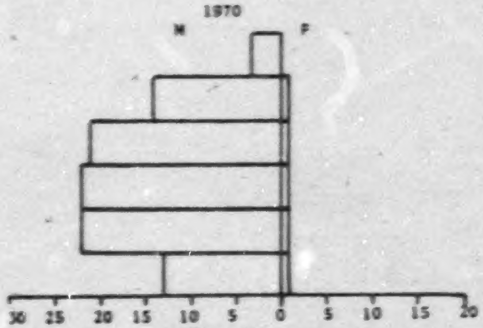


Percent
238,318 = 100%

CONSTRUCTION



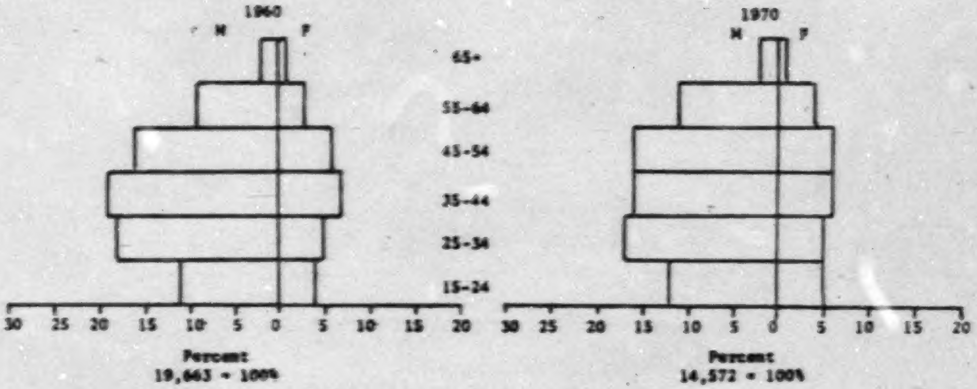
Percent
39,713 = 100%



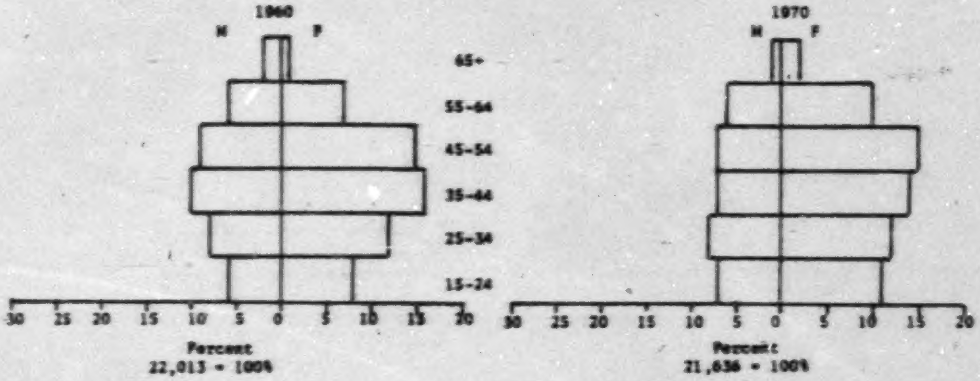
Percent
41,495 = 100%

Appendix C
(continued)

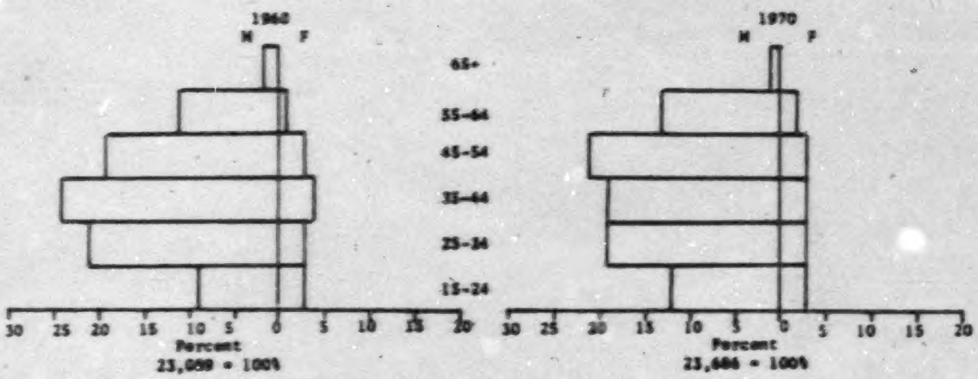
FOOD



TEXTILE

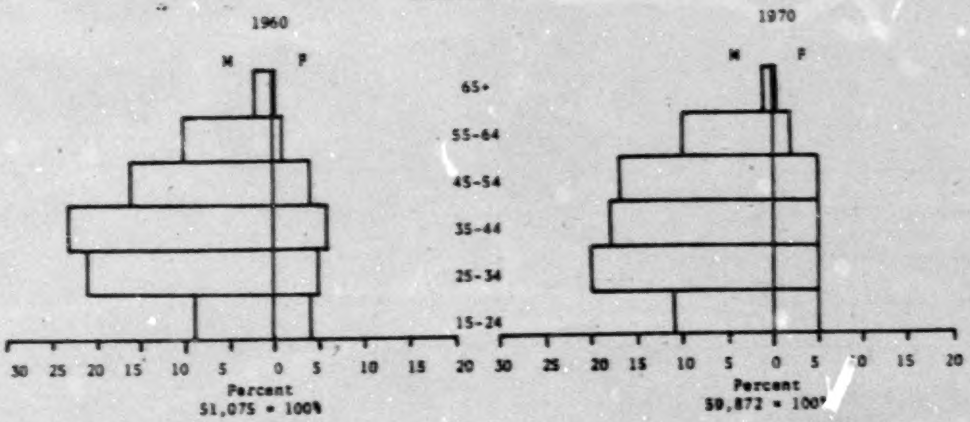


METAL

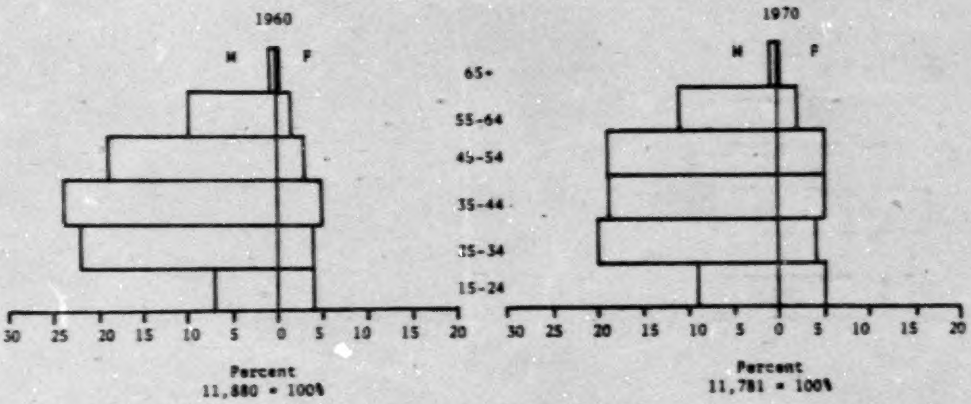


Appendix C
(continued)

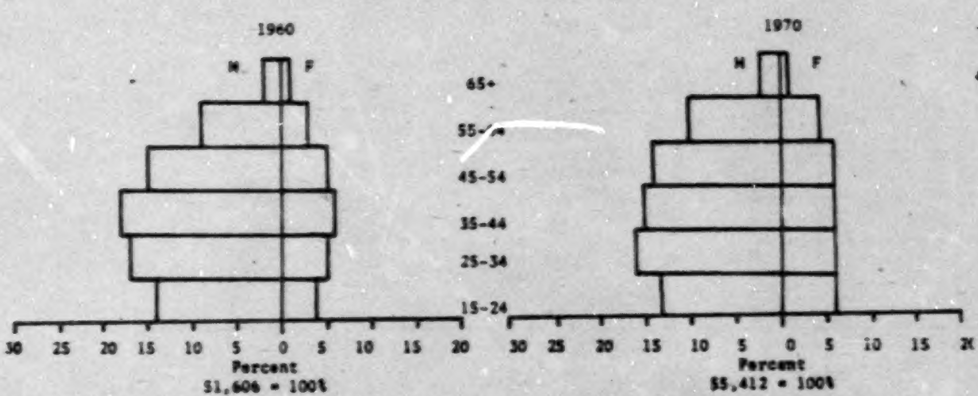
MACHINERY



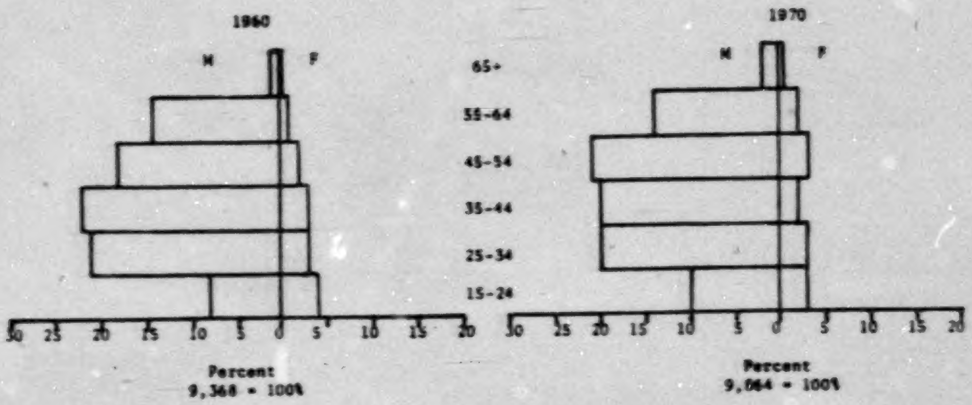
CHEMICAL



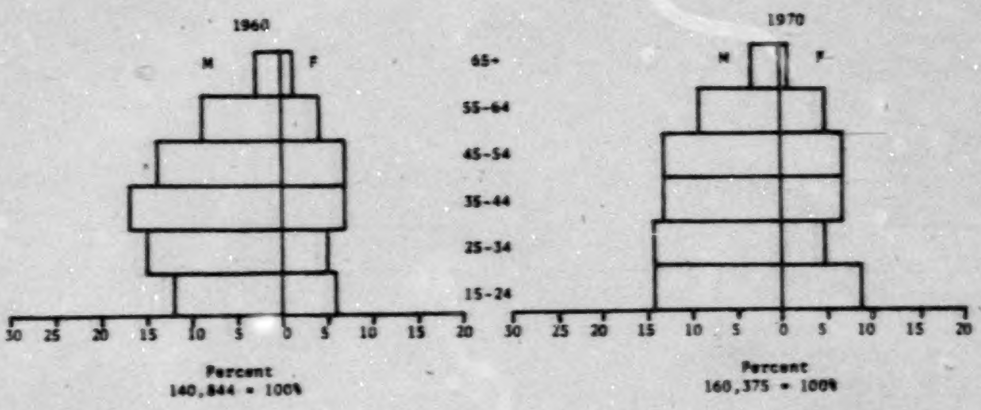
MISCELLANEOUS MANUFACTURING



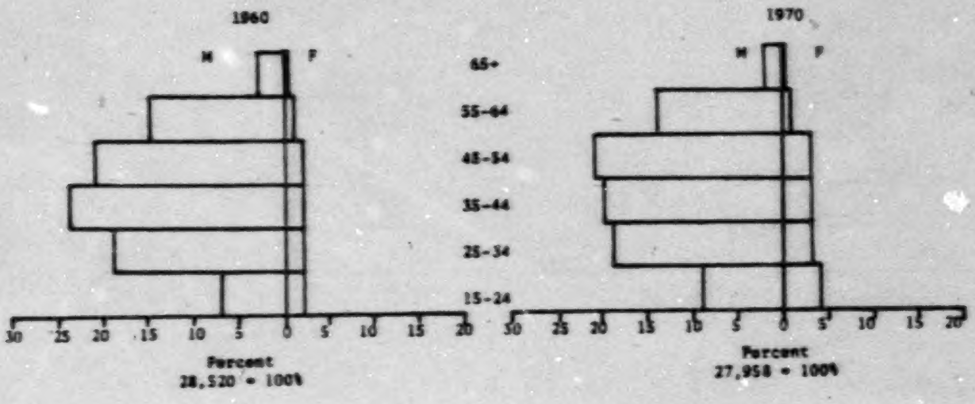
UTILITIES



DISTRIBUTIVE

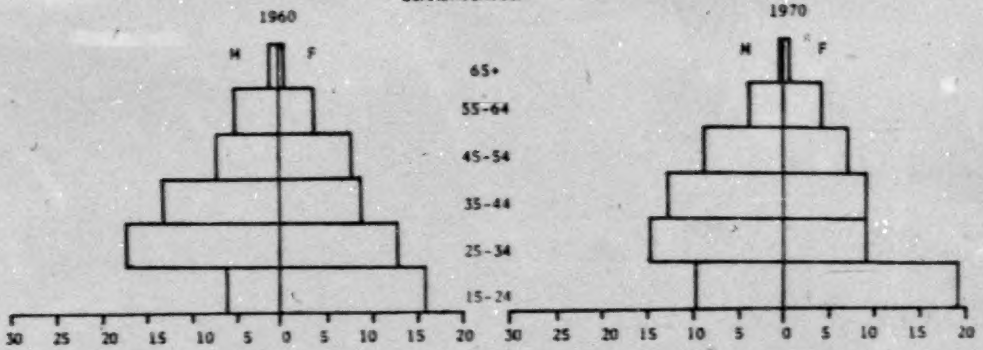


TRANSPORTATION



Appendix C
(continued)

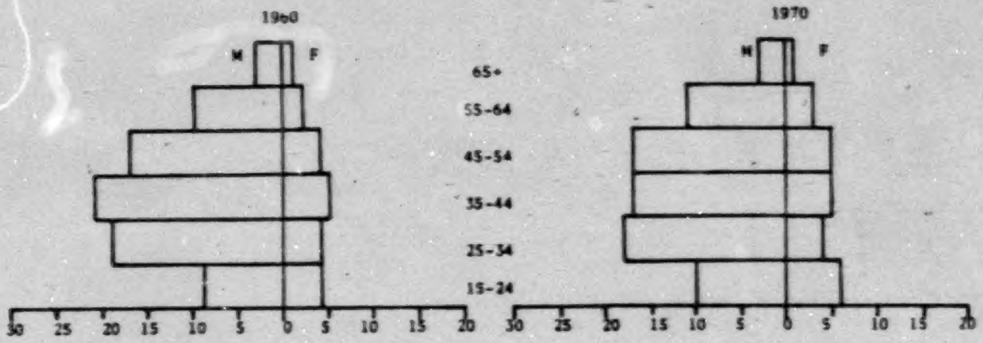
COMMUNICATION



Percent
8,531 = 100%

Percent
10,870 = 100%

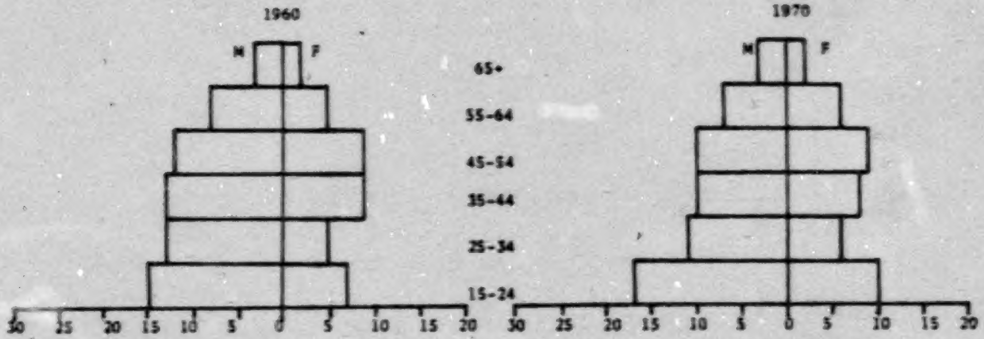
WHOLESALE



Percent
23,015 = 100%

Percent
29,688 = 100%

RETAIL

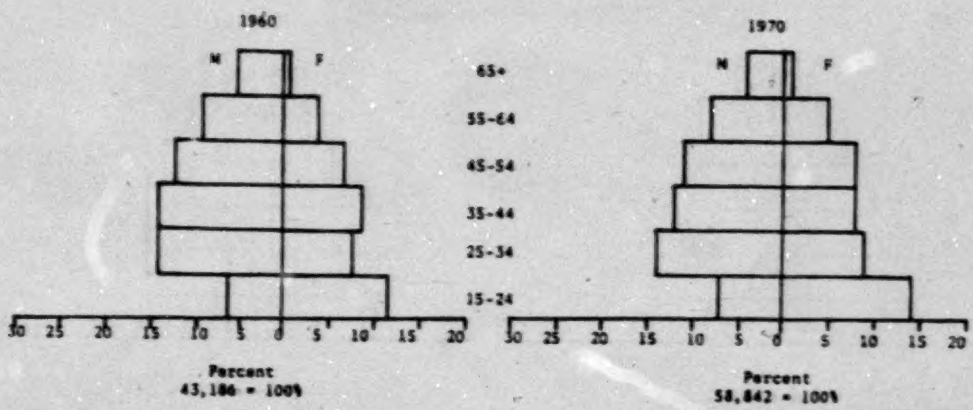


Percent
80,778 = 100%

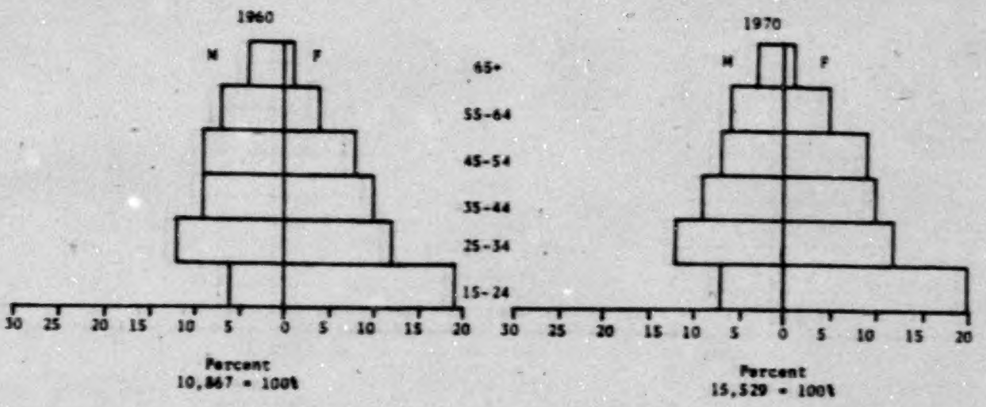
Percent
91,857 = 100%

Appendix C
(continued)

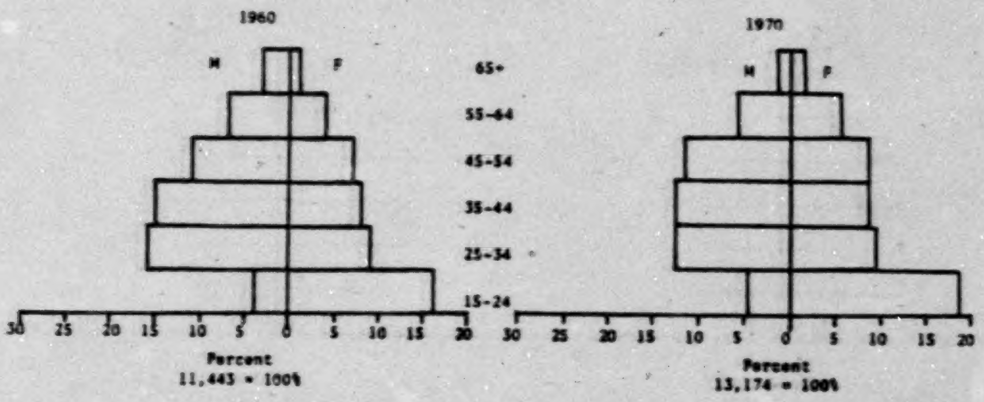
PRODUCER SERVICES



BANKING

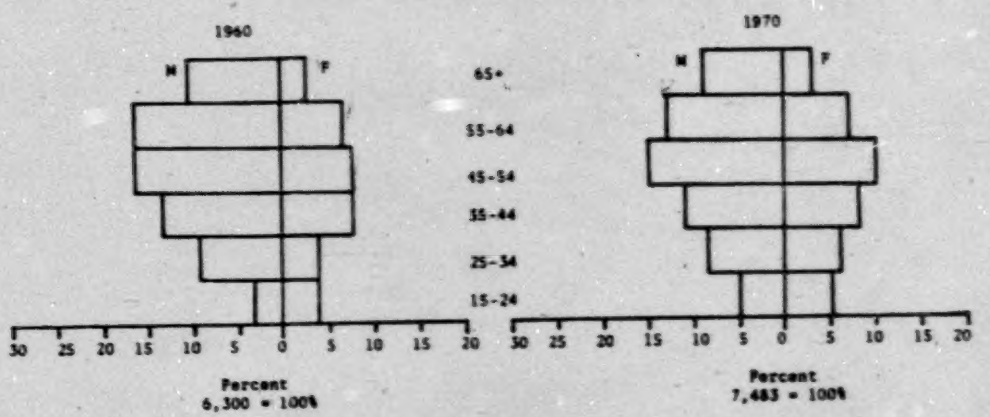


INSURANCE

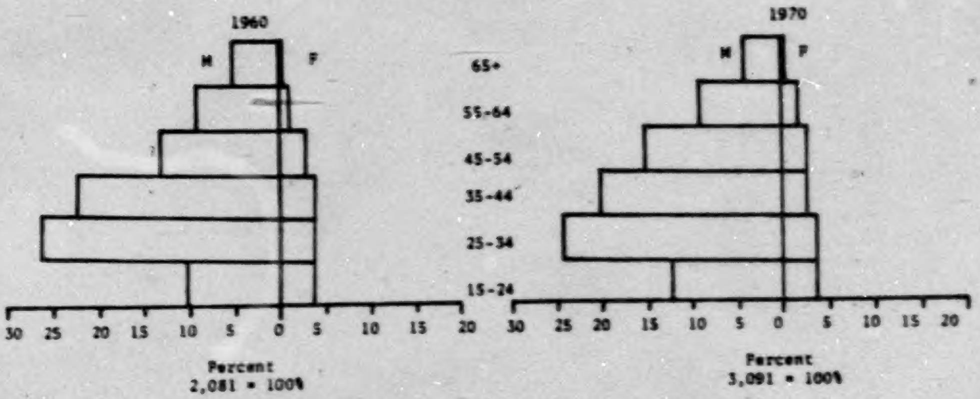


Appendix C
(continued)

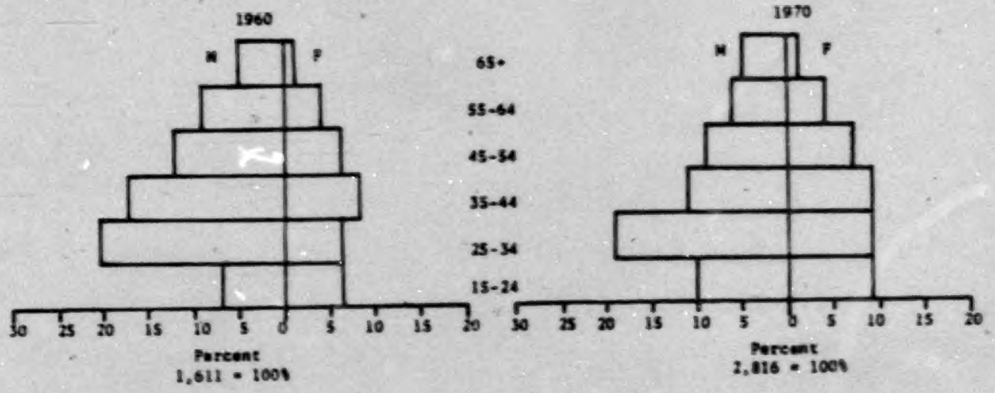
REAL ESTATE



ENGINEERING

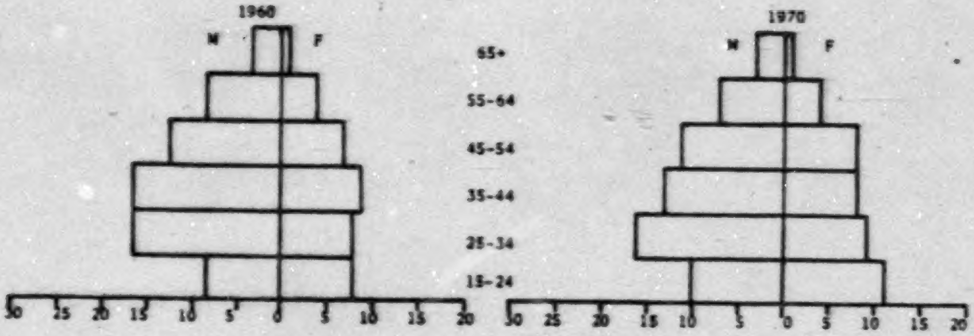


ACCOUNTING



Appendix C
(continued)

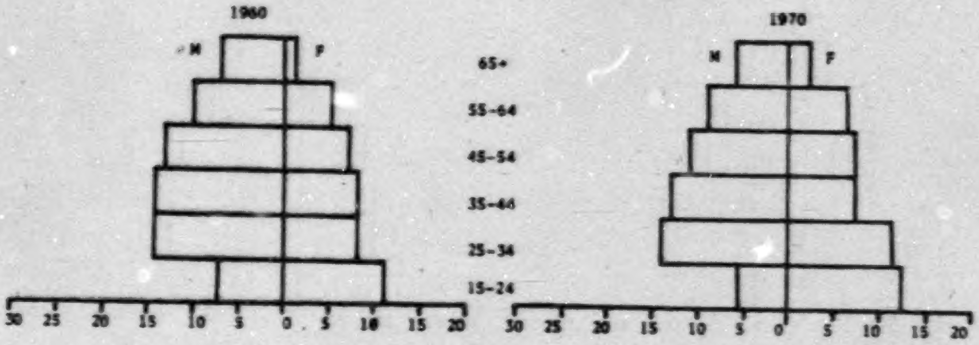
MISCELLANEOUS BUSINESS SERVICES



Percent
7,972 = 100%

Percent
12,885 = 100%

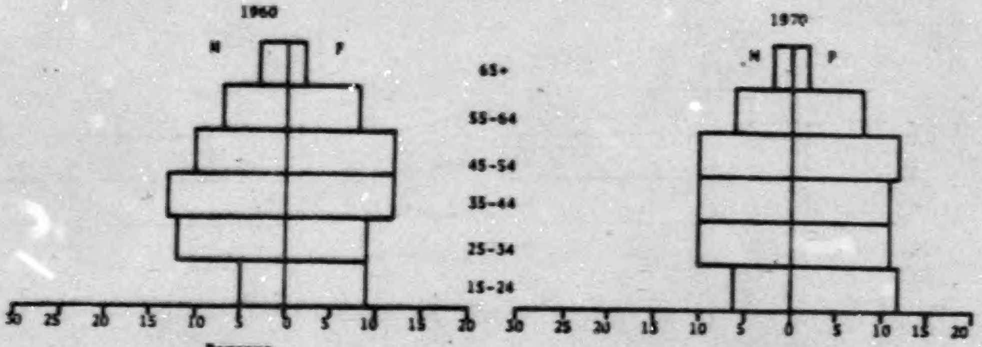
LEGAL



Percent
2,912 = 100%

Percent
3,864 = 100%

SOCIAL SERVICES

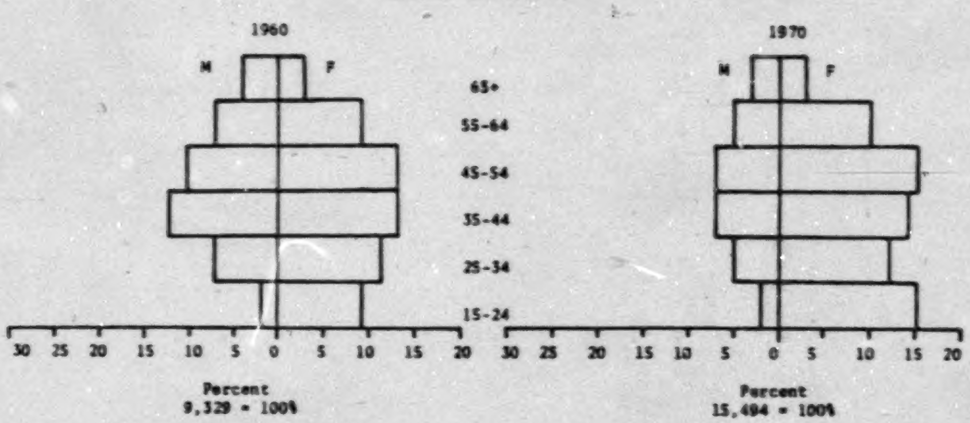


Percent
106,033 = 100%

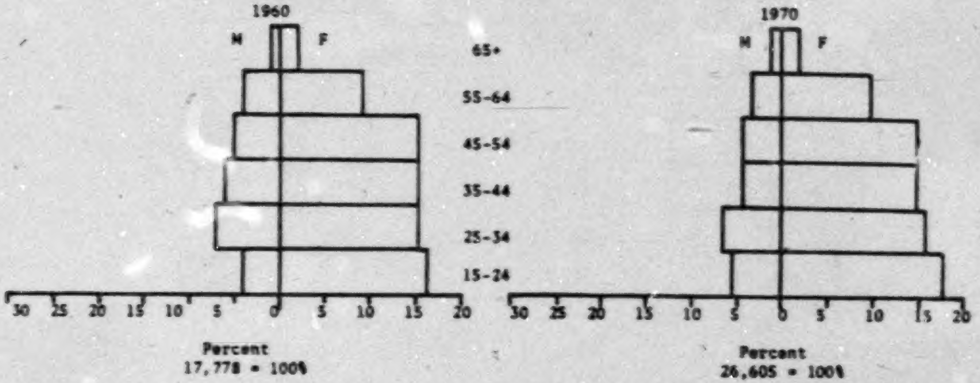
Percent
157,304 = 100%

Appendix C
(continued)

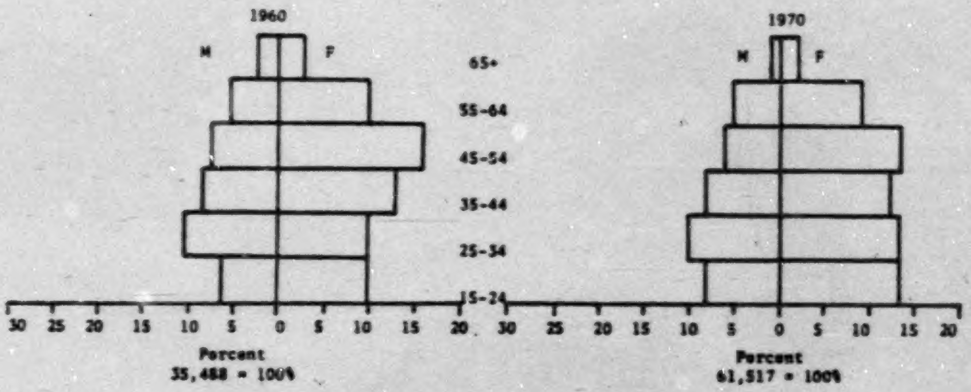
MEDICAL SERVICES



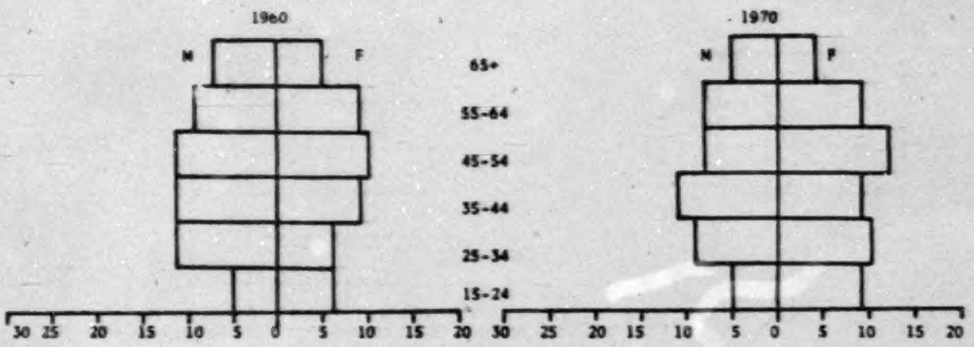
HOSPITALS



EDUCATION



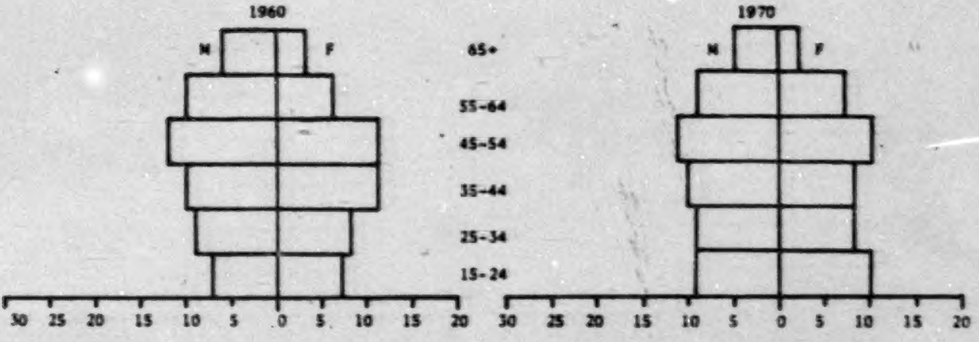
WELFARE



Percent
6,391 = 100%

Percent
8,605 = 100%

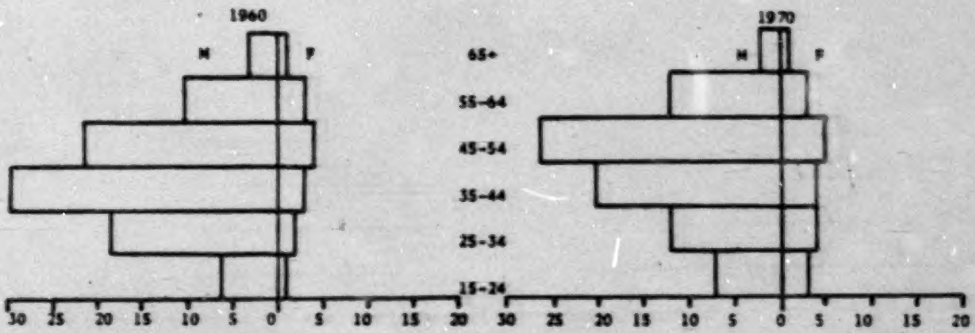
NON-PROFIT



Percent
2,543 = 100%

Percent
3,112 = 100%

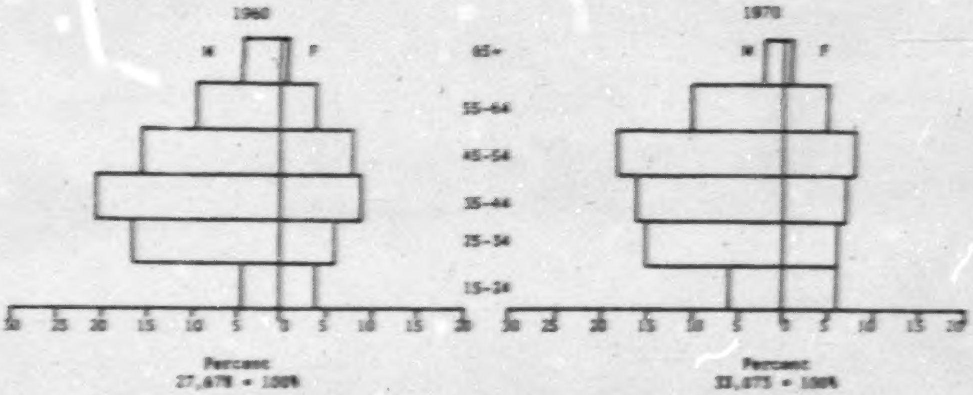
POSTAL SERVICES



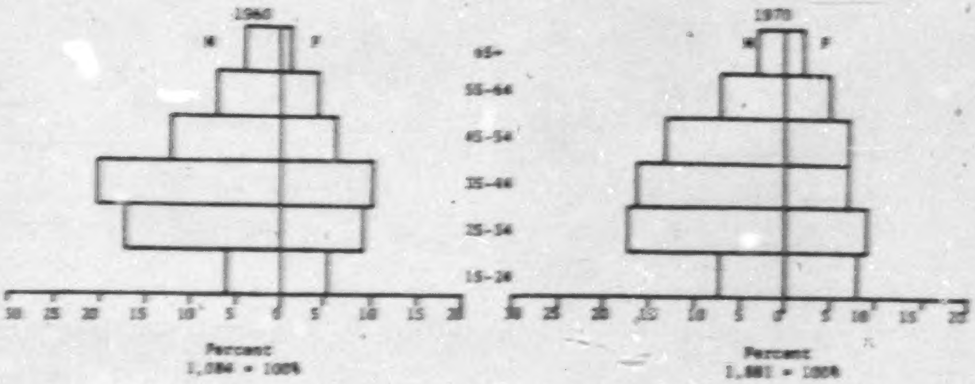
Percent
5,742 = 100%

Percent
7,107 = 100%

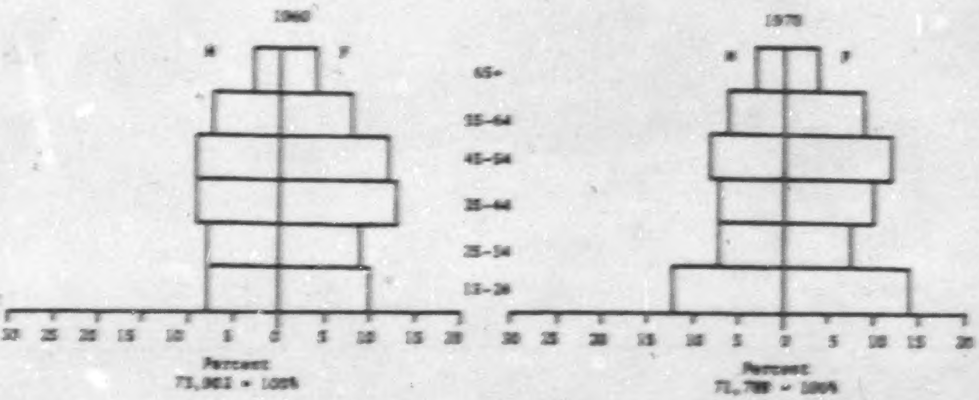
GOVERNMENT



MISCELLANEOUS SOCIAL SERVICES

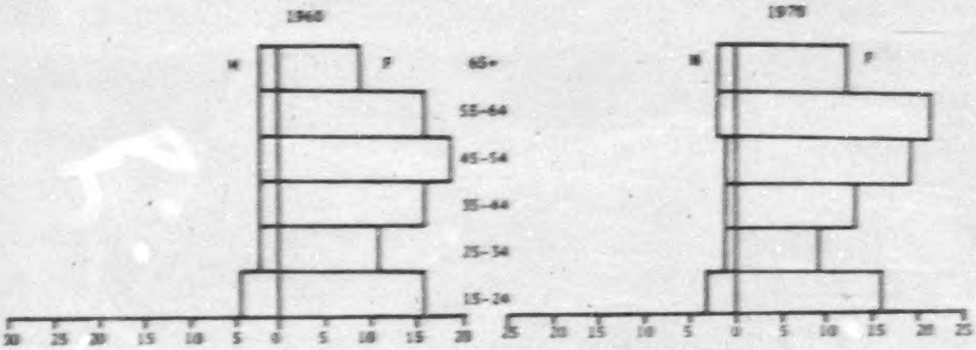


PERSONAL SERVICES



Appendix C
(continued)

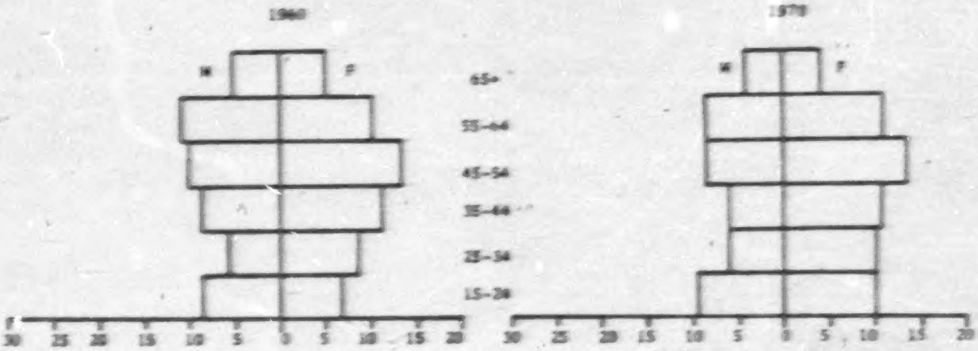
DOMESTIC



Percent
20,137 = 100%

Percent
11,892 = 100%

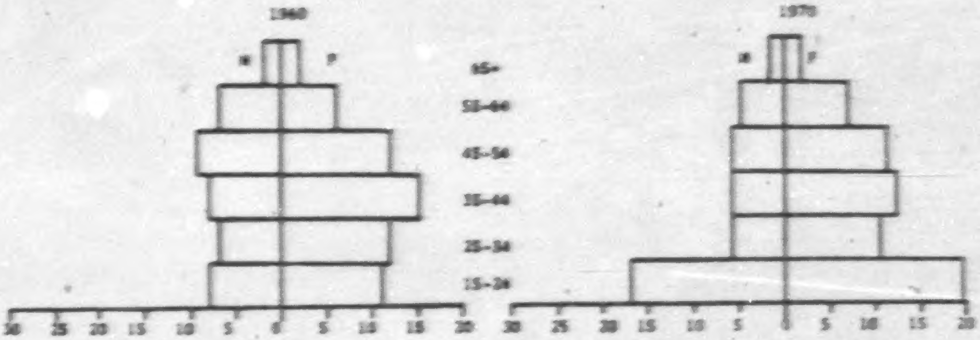
HOTELS



Percent
6,445 = 100%

Percent
6,849 = 100%

EATING & DRINKING

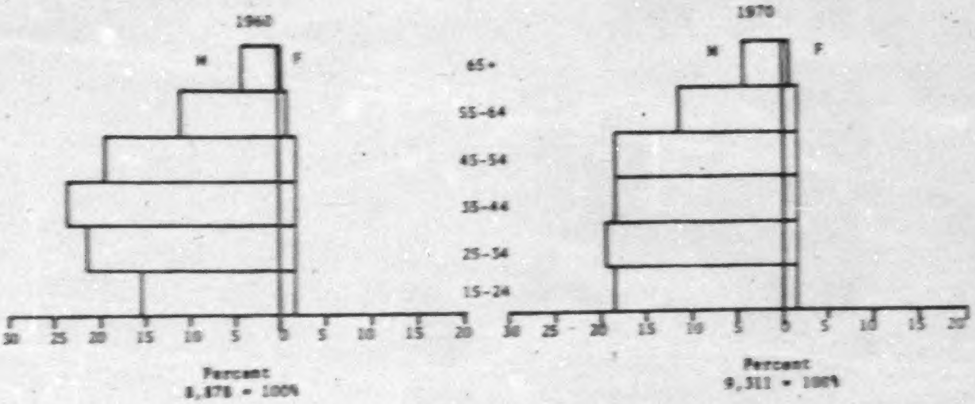


Percent
16,974 = 100%

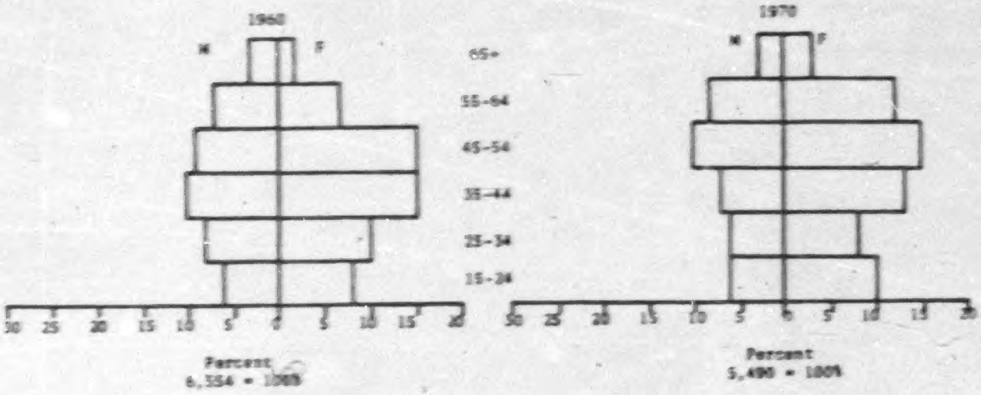
Percent
23,651 = 100%

Appendix C
(continued)

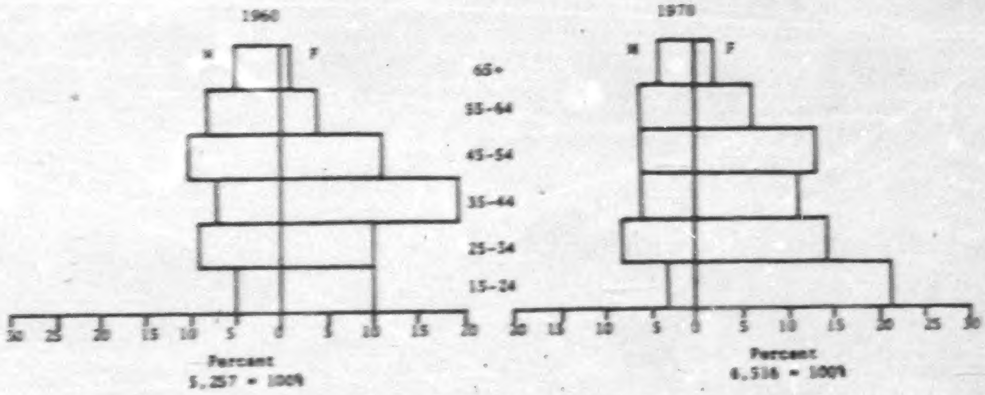
REPAIR



LAUNDRY

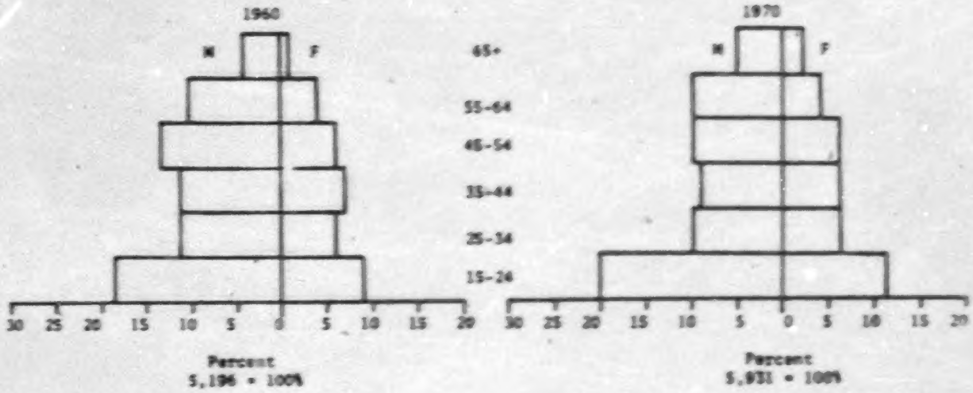


BARBER & BEAUTY SHOP

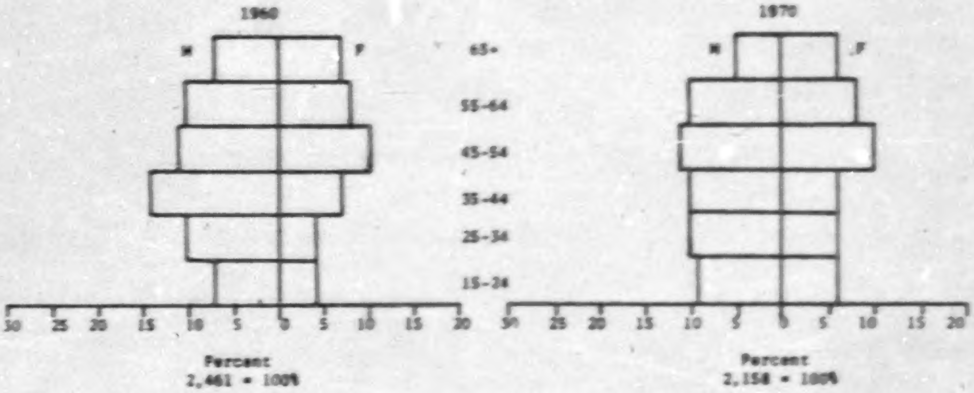


Appendix C
(continued)

ENTERTAINMENT



MISCELLANEOUS PERSONAL SERVICES



Appendix D

ALLOCATION OF OCCUPATIONS

By and large, we have used the same one-digit occupational categories as given in the 1960 and 1970 Technical Description and Documentation of the Public Use Samples (U.S. Bureau of the Census, 1971; 1972). For both years, private household workers were included in the category service workers. In 1970, transport equipment operatives were combined with operatives to make the categories comparable with the 1960 divisions. The only major change that we made was the differentiation of professionals into: (a) professionals and (b) semi-professionals. The following listing contains the Public Use Sample codes for these two occupational categories.

1960

Professionals:	000, 012-014, 020-022, 030-032, 034-035, 040-043, 045, 050-054, 060, 071, 080-085, 090-093, 101-102, 105, 111, 130-135, 140, 145, 150, 152-154, 160, 162, 172-175, 182-184, 194
Semi-Professionals:	010, 015, 023, 070, 072-075, 103-104, 120, 151, 161, 163-165, 170-171, 180-181, 185, 190-193, 195

1970

Professionals:	001-002, 006, 010-015, 020-024, 030-036, 042-045, 051-056, 061-065, 071-073, 075, 091-096, 102-105, 110-116, 120-126, 130-135, 140, 142, 144-145, 163, 170, 181, 194
Semi-Professionals:	003-005, 025-026, 074, 076, 080-086, 090, 100-101, 141, 143, 150-156, 161-162, 164-165, 171-175, 180, 182-185, 190-193, 195

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